BUCHANAN
Life is better here.

City of Buchanan, Michigan

Water and Sewer Feasibility Study

to Serve an Area South and East of the City of Buchanan including the Bertrand Township Industrial Campus

Successful partnerships start with Fluid thinking®

Submitted by Jones & Henry Engineers, Ltd.
4791 Campus Drive, Kalamazoo, MI 49008

Jones & Henry
Engineers

Table of Contents

List of Figures

Introduction

The City of Niles currently provides both water and sewer service to the Bertrand Township Industrial Campus. The City of Niles Grant Street siphon crossing the St. Joseph River needs to be replaced. The siphon is a capacity restriction resulting in sewer overflows during wet weather events.

In order to provide some relief to the City of Niles sewer system while still allowing future expansion growth in the Bertrand Crossing Industrial Complex, the City of Buchanan, Buchanan Township, and Bertrand Charter Township, asked Jones & Henry Engineers, LTD, to prepare a feasibility study to extend both water and sewer services to the study area. The study area includes an area south and east of the City of Buchanan (quarry parcels and residential areas) along with the Bertrand Crossing Industrial Campus. See Figure 1 showing the proposed study area.

Existing Water System

The watermain supplying the Bertrand Township Industrial Campus connects to the City of Niles distribution system near Ballard Elementary school on Sioux Trail. Approximately 8200 feet of 12-inch water main is installed between Sioux Trail and the intersection of W. Chicago Road and US-12. At the intersection of US-12 and W. Chicago Road the water main increases in size to a 16-inch water main and runs another 7150 feet to the intersection of the Bertrand Township Fire District Station II driveway and Foundation Drive. At the intersection, the water main decreases in size back to a 12-inch water main before heading south on Foundation Drive 2440 feet to the intersection of Foundation Drive and W. Chicago Road. From that point, the water main heads northeasterly along W. Chicago Road, 970 feet terminating at the water tower located at 2895 W Chicago Road. See Figure 2 showing both the existing water main route and proposed improvements.

The water tower is a 48-foot diameter spheroid structure constructed in 2004, with a 300,000 gallon tank capacity, head range of 30 feet, a low water level of 910 feet, a high-water level of 940 feet, and an overflow elevation of 941 feet. The base of the water tower is at elevation 812.00 feet. See Figure 3. References: (Dixon Engineering Tank Inspection Report dated October 26, 2016, and Abonmarche Consultants Tank Layout drawing dated March 2004).

Existing Sewer System

Wastewater in the Bertrand Township Industrial campus is collected into an 8-Inch gravity sanitary sewer in Foundation Drive which discharges to a 10-inch gravity sewer near the intersection of Foundation Drive and the Bertrand Township Fire Department Driveway. The 10-inch sewer discharges to the Bertrand Township pump station. The pump station is a duplex submersible pump station located at the north end of the Bertrand Township Fire District Station II property at 1895 Foundation Drive, Niles, Michigan 49120.

Two alternating (5HP) submersible pumps with total dynamic head of 26 feet discharge to a 8-inch ductile iron force main. The 8-inch force main (5293 feet) discharges to a 10-inch gravity sewer (1270 feet) prior to discharging to a 8-inch sewer (198 feet). The 8-inch gravity sewer discharges to the City of Niles Western Electric pump station. See Figure 4 showing both the existing sewer route and proposed sewer improvements. See Figure 5 showing the existing Bertrand Township pump station.

Water System Flow Demand Bertrand Township

As mentioned above, the Bertrand Crossing Industrial Campus is currently served by the City of Niles with both water and sewer. Table 1, below displays the amount of water pump and sold to Bertrand Township from years 2019 to 2024 excluding (Covid) year 2021. The following data was taken from the City of Niles Utilities Department Annual Reports (2019-2024). See Figure 6.

Table 1: Water Pumped and Sold In Gallons By Year

Location	2019	2020	2022	2023	2024
Bertrand Governmental	41,888	21,692	5,984	6,732	5,236
Bertrand Commercial	604,384	934,252	2,891,769	2,546,940	2,180,420
Bertrand Industrial	4,510,440	3,704,096	2,312,068	11,576,796	15,345,220
Bertrand Lake Michigan College	213,180	194,480	183,260	198,220	194,480
Bertrand Township Totals (Gallons per Year)	5,369,892	4,854,520	5,393,081	14,328,688	17,725,356
Bertrand Township Totals (Gallons per Day)	14,712	13,300	14,775	39,257	48,563

In 2024, the City of Niles delivered the most amount of water it ever has to Bertrand Crossing Industrial Campus (17,725,356 gallons per year or 48,563 gallons per day). The City of Buchanan has informed Jones & Henry that an Industrial Developer is looking to purchase vacant land in the campus and has a projected water demand of 22 million gallons of water per year or (60,274 gallons per day). A potential increase of 243% over the current water demand on campus.

Current Zoning (Parcels Served by the City of Niles)

The Bertrand Crossing Industrial Campus consists of 215.73 acres of land zoned “Industrial” in Bertrand Township. It is the only industrial zoned land served by the City of Niles.

The only commercial zoned land in Bertrand Township served by the City of Niles is the JD Scales site located near the northwest corner of US-12 and US-31 intersection and sits on 11.11 acres of land.

The City of Niles does not service any residential properties in Bertrand Township. See Figure 7 showing both the current and future Bertrand Township Zoning.

Likely Flow Contribution Rates

The Bertrand Crossing Industrial Campus has seventeen (17) sites on 215.73 acres. See Figure 1. Fourteen (14) of the seventeen (17) sites are currently occupied and have buildings on site. Three (3) sites are vacant land, eleven (11) sites are partially developed (50%) with room for future growth, and three 3 lots are fully developed (100%) without room for future growth. Therefore, at present, approximately 55% of the land is developed.

The average industrial water flow per acre based upon the 2024 water usage is 17,725,326 gallons per year or 225 gallons per day per industrial acre. If the industrial developer requiring 22 million gallons of water per year develops on a vacant land site within the campus, this figure would increase to 504 gallons per day per industrial acre.

If the remaining sites become 100% developed, an additional 7 million gallons of water per year can be expected when the Industrial Campus is fully developed. If the Industrial Campus is expanded to include another 156 acres as shown in Figure 1, another 12,811,500 gallons per year can be expected. Therefore, the long-term water system flow demand could reach as high as 59.5 million gallons of water per year or 439 gallons per day per industrial acre.

For years 2019 to 2024, excluding year 2021, From Table 1 above, the City of Niles provided on average provided 1,439,153 gallons of water per year for the commercially zoned properties (11.11 acres) in Bertrand Township, or 355 gallons per day per commercial acre. This figure is in line with what should be expected for typical commercially zoned properties (350 gallons per day per acre) and corresponds to Fishbeck's flow monitoring technical memo to the City of Niles dated March 22, 2024. See Figure 8.

There were no residential properties in Bertrand Township serviced by the City of Niles. To determine the average residential use, an estimate of 100 gallons, per capita, per day for residential properties with an average of 2.5 people per residential lot. Therefore, the average flow per residential lot would be 250 gallons per day.

The above figures represent average flow values. A peaking factor of 2.0 should be applied when using peak flow analysis for industrial zoned land. The industrial complex wastewater generation is fairly constant throughout the day, therefore a peaking factor of 2.0 is appropriate. A peaking factor of 3.0 should be applied when using peak flow analysis for commercially zoned land. A peaking factor of 4.0 should be applied for residentially zoned land and a peaking factor of 1.5 could be applied to the landfill's property.

Proposed Water Distribution Route

Jones & Henry reviewed both the City of Buchanan and City of Niles water distribution maps. The shortest route to the Industrial Campus, and most likely connection point to the City of Buchanan water distribution system is to extend a new 12-inch water main connecting to the existing 12-inch water main located at the east end of Chamberlain Road (approximately 220 feet west of Mayflower Road). Additional routes were reviewed, however, the shortest and least expensive route to serve the area southeast of the City of Buchanan and the Bertrand Township Industrial Campus is to connect to the existing 12-inch watermain on Chamberlain Road.

Bore & Jack Water main

In order to reach the Industrial Campus from Chamberlain Road, the new 12-inch water main will need to be bored and jacked at two locations. Once when crossing the Amtrak railroad tracks on Mayflower Road, and again when crossing US-12. We anticipate 120 LF of 20-inch steel casing will need to be bored & jacked beneath the Amtrak railroad tracks and another 140 LF of 20-inch steel casing beneath US-12.

Water Distribution Hydraulics

The City of Buchanan gets its water supply from four wells with a combined pumping capacity of 3330 gallons per minute and a firm capacity with the largest well out of service of 2311 gpm. The City also has two water towers. The Mocassin tank holds 250,000 gallons and the Front Street tank holds 500,000 gallons.

The future ultimate peak flow from the Bertrand Township Industrial Campus using the peaking factors above has a total water demand of approximately 221 gpm. Therefore, (without modeling the entire City of Buchanan water system) it appears the existing wells have capacity to service the future needs of the Bertrand Township Industrial Campus. As additional information is required for design, a model of the existing City of Buchanan water distribution system should be performed.

The Bertrand Crossing Industrial Complex is currently served by the City of Niles through a 16-inch water main. The 16-inch water main was installed in 1997 and enters the Industrial Complex through a 50' wide easement located just west of the US-12 and US 31 interchange and connects to the Bertrand Township Fire District property. A 2019 fire hydrant flow test performed by F.E. Moran, Inc. indicated an available fire flow of 1165 gpm at the intersection of Mayflower Road and Foundation Road with a static pressure of 50 psi and residual pressure of 40 psi. See Figure 9

Pressure Boosting Equipment and Pump Curves

The City of Buchanan has an existing water pressure boosting pump station located in Buchanan Township on Rynearson Road approximately 1000 feet northwest of the intersection of Huron Drive and Rynearson Road. The incoming pipe to the City of Buchanan booster pump station is a 12-inch ductile iron watermain and the discharge pipe is an 8-inch ductile iron pipe. The pressure is boosted by two pumps. One pump is a 20 HP Peerless horizontal pump (Serial No. Z 1808150481) rated at 847 gpm at 65 feet of total dynamic head (TDH). The second pump is a spare pump installed due to a failure of Jockey Pump #3 which is 7.5 HP peerless horizontal pump (Serial No. UA50846) rated at 125 gpm at 75 feet TDH. It appears the spare pump is used in parallel to help with the 20 HP Peerless pump. See pump curves in Figure 10.

Water main Route (Booster Pump Station to Chamberlain Road).

From the Booster pump station approximately 1800 feet of 8-inch water main is installed on the west side of Rynearson Road to Ontario Drive. At the intersection of Ontario Drive and Rynearson Street the water main becomes a dead-end line and increases in size to a 12-inch ductile iron water main extending 945 feet on the west side of Rynearson Road before turning east on the north side of Chamberlain Road

4480 feet to the terminus end, which is located approximately 220 feet west of the intersection of Chamberlain Road and Mayflower Road. See Figure 2.

To extend a 12-inch water main to the Industrial Campus, an additional 220 feet of 12-inch watermain would need to be installed east on Chamberlain Road, then turn south on the east side of Mayflower Road another 4000 feet to the intersection of Mayflower Road and Foundation Drive where it would connect to the existing 12-inch water main stub located on the north side of the intersection. See Figure 2 showing both the existing water main and proposed watermain locations.

Table 2: Existing System Calculations

Booster Pump Station (1000 northwest of the intersection of Rynearson Road and Huron Drive).
Proposed fire flow in Industrial Park= 1500 gpm at 40 p.s.i. residual
Available fire flow= 1165 gpm at 40 p.s.i residual
Head Loss due to friction neglecting minor losses (8-inch pipe) = 40.4 feet
Head Loss due to friction neglecting minor losses (12-inch pipe) = 37.2 feet
Head Loss due to friction neglecting minor losses (16) inch pipe = 0.2 feet
Total Head Loss due to friction neglecting minor losses = 77.8 feet
Head Loss due to elevation = Elevation Difference = 209 feet (941 – 732)
Total Dynamic Head (TDH) = 209 feet + 77.8 feet= 286.8 Feet

See Figure 10 showing the existing booster pump station pump curves.

Therefore, due to head conditions, the existing pumps cannot provide enough flow capacity to the Industrial Park without upgrades. Rather than upgrading the existing booster pump station with significant pressure reducing valves servicing the nearby residential areas on Rynearson Road, it's our recommendation that another booster pump station be constructed at the end of the existing water main on Chamberlain Road approximately 220 feet west of Mayflower Road at 1380 Mayflower Road, Niles Michigan 49120.

Table 3: Proposed Upgraded System Calculations

Proposed fire flow in Industrial Park= 1500 gpm at 40 p.s.i. residual
Current fire flow= 1165 gpm at 40 p.s.i residual
Head Loss due to friction neglecting minor losses (8-inch pipe) = 5.1 feet
Head Loss due to friction neglecting minor losses (12-inch pipe) = 22.4 feet

Head Loss due to friction neglecting minor losses (16) inch pipe = 0.2 feet
Total Head Loss due to friction neglecting minor losses = 27.7 feet
Head loss due to elevation = Elevation Difference = 161 feet (941 – 780)
Total Dynamic Head (TDH) = 161 feet + 27.7 feet= 188.7 Feet
Proposed pump size = 125 HP Aurora Pump Model 411 or equal.

See Figure 11 Proposed Booster Pump Station Pump Curve for Aurora Pump Model 411.

Sanitary Sewer Extension (Gravity vs. Force main)

Due to the project area's topography, and street elevations on Rynearson Road and Chamberlain Road it is impractical to serve the Industrial Campus by gravity sewer alone. We anticipate two duplex submersible pump stations will need to be daisy chained together and used in tandem with additional gravity sewer to serve the area southeast of the City of Buchanan and the Bertrand Crossing Industrial Complex.

The closest gravity sewer to the Bertrand Crossing Industrial Complex (without major modifications to the existing Crescent View residential pump station or the landfill leachate pump station) is to connect to the existing sanitary manhole No. 14 at station 35+40 on Rynearson Road or approximately 340 feet north of the intersection of Rynearson Road and Huron Drive. Sanitary Manhole 14 is connected to an 8-inch gravity sewer (invert elevation of 756.70) at 4.38% with a capacity of 3.29 cfs or 1476 gpm. It should be noted however, only 685 LF downstream of MH14 the existing 8-inch sewer between manholes 9A and 10 (244 LF) was laid at 0.3% grade (below minimum grade 0.4% for an 8-inch sewer) and has a capacity of 0.86 cfs or 386 gpm. The 8-inch sewer between MH 9A and MH 10 (244LF) may need to be upsized to a 10-inch sewer with a capacity of 700 gpm during final design.

As mentioned above, two pump stations will be needed along the proposed route.

We recommend gravity sewer be installed in combination with the pump station force mains taking advantage of the natural grades and maximizing utility installation while the roadway is disturbed. Additional 8-inch gravity sewer could be installed on both Rynearson Road and Chamberlain Road. See Figure 2.

If a suitable arrangement can be made with the City of Niles, we recommend Bertrand Township take over the ownership of the pump station with the City of Buchanan taking over the operation and maintenance of the pump station. The pump station will need to be retrofitted with new pumps and electrical equipment. Both pumps will need to be replaced. We do not anticipate any major issues with replacing the pumps and redirecting the flow.

It should be noted, in a Fischbeck Technical Memo dated March 22, 2024, the Bertrand Township pump station discharges to the City of Niles Western Electric pump station and the Western Electric force main has had several failures in recent years and is at the end of its useful service life. Redirecting the flow to

the City of Buchanan versus the City of Niles could provide some relief to the Western Electric pump station. See Figure 8 Fishbeck's Technical Memorandum dated March 22, 2024.

Alternatively, if a suitable arrangement cannot be made, an alternative would be to install a new pump station immediately adjacent to the existing pump station on the north side of Bertrand Township Fire District Station II property. From there a new 8-inch force main will head north 780 feet crossing US-12 and then head west (660 feet) along the north side of US-12 to the west side of Mayflower Road, then north (2812 LF) along Mayflower Road crossing both US-12 and the Amtrak railroad tracks, before heading northwesterly along Chamberlain Road 120 feet discharging to a new 8-inch gravity sewer located approximately 150 west of the intersection of Chamberlain Road and Mayflower Road.

The gravity sewer will then flow westerly approximately 630 feet to the low point on Chamberlain Road discharging to the second pump station located at 2937 Chamberlain Road or approximately 780 feet west of the intersection of Chamberlain Road and Mayflower Road.

The second pump station will discharge through an 8-inch force main located on the south side of Chamberlain Road running parallel to the existing 3-inch leachate force main. The 8-inch force main (4000 feet) will discharge to a new 8-inch gravity sewer located in Rynearson Road approximately 150 feet north of the intersection of Rynearson Road and Chamberlain Road.

Sanitary Sewer Connection Point

Approximately 2180 LF of 8-inch gravity sewer will need to be installed in Rynearson Road connecting to existing sanitary manhole No. 14 at station 35+40 Rynearson Road which is located approximately 340 feet north of the intersection of Rynearson Road and Huron Drive.

Alternatively, approximately 3950 feet of 8-inch gravity sewer could be installed in Chamberlain Road to provide sanitary sewer service to the properties along Chamberlain Road. The 8-inch sewer would extend easterly from the high point elevation on Chamberlain Road or approximately 150 east of the intersection of Rynearson Road and Chamberlain Road discharging to the second pump station (Pump Station No. 2) located at 2937 Chamberlain Road or approximately 780 feet west of Mayflower Road.

Due to the depth of the sanitary sewer plus the need to avoid existing utilities on Chamberlain Road (12-inch watermain, (north lawn area) and 3-inch force main (south lawn area) while maintaining 10 feet of horizontal separation distance from the existing water main, we anticipate the new force main and gravity sewer being installed beneath the pavement area on Chamberlain Road.

With the alternate design, the existing landfill leachate gravity sewer could be connected to the new 8-inch gravity sewer in Chamberlain Road and the landfill's leachate pump station and 3-inch force main abandoned in place upon completion of the project.

Bore & Jack Sanitary Force main

The force main on Mayflower Road will need to be bored & jacked across both US-12 and again across the Amtrak railroad tracks on Mayflower Road. We anticipate up to 140 LF of 20-inch steel casing will need to be installed across US-12 and another 120 LF of 20-inch steel casing under the Amtrak railroad tracks.

Sanitary Baseline Pump Station Requirements

Table 4: Pump Station No. 1 (Bertrand Township Fire District Station II)

Capacity of Existing Pump Station = 233 gpm.
10-inch invert elevation 778.58
Current Industrial average flow into Pump Station: 15,345,220 gal/year = 29.2 gpm
Current Peak Flow (Peaking Factor = 2.0) in pump station: 58.4 gpm
Future Anticipated Flow into Pump Station 56,000,000 gal/year = 106.6 gpm
Future Peak Industrial Flow into Pump Station No. 1 = 213.1 gpm
Average Commercial Flow into Pump Station No. 1 = 3,025 289 gal/year = 5.75 gpm
Future Peak Commercial flow into Pump Station No. 1 = 17.3 gpm
Total Future Flow into Pump Station = 230.4 gpm
Approximate Centerline of Pump Elevation 772.50
Bottom elevation 772.00
Existing Ground elevation at Pump Station No. 1 796.50
Wet Well 8’ Diameter 6.6 feet in depth
Total Depth of existing station (796.50 – 772) = 24.5 feet
Discharge Elevation at 8-inch Gravity Sewer on Chamberlain Road = 806.00
Lowest Point between PS1 and PS2 at Amtrak RR Tracks Elevation = 782
Assumed Invert Elevation of 8-inch force main when crossing railroad tracks Elevation = 767
8-inch Force main distance = 4372 feet
Headloss due to friction = 1.4 feet
HeadLoss due to elevation = (806-767)= 39 feet
Total Dynamic Head (TDH) = 40.4 Feet
Proposed duplex submersible pumps Homa Model OC4x4-200/4, 3T/C 235 GPM at 40.5 feet TDH.
Required 233 gpm at 40.4 feet TDH.

See Figure 12 Proposed pump curve for HOMA Model OC4x4-200/4, 3T/C.

Table 5: Pump Station No. 2 (Located 780' west of the intersection of Chamberlain Road and Mayflower Road

Current flow into Pump Station: 15, 345,220 gal/year = 29.2 gpm
Current Peak Flow (Peaking Factor = 2.0) in pump station: 58.4 gpm
Future Anticipated Flow into Pump Station 56,000,000 gal/year = 106.6 gpm
Future Peak Flow from Pump Station No. 1 = 213.1 gpm
Future flow from Residential Properties (40) = 10,000 gpd = 7 gpm
Future peak flow from residential properties = 28 gpm
Future flow from Landfill = 4,000,000 gal/year = 7.6 gpm
Future Peak Flow from Landfill Peaking Factor 1.5 = 11.4 gpm
Total Peak flow Pump station No. 2 = 267.1 gpm
Pump station No. 2 Ground Elevation = 794.00
Proposed 8-inch invert elevation into pump Station No. 2 = 783.00
Pump station No. 2 Proposed Centerline of Pump Elevation 775.50
Pump Station No. 2 Bottom of Wet Well Elevation 775.00
Discharge Elevation at 8-inch Gravity Sewer on Rynearson Road = 815.00
8-inch Force main distance = 4000 feet
Head Loss due to friction = 1.8 feet
Head Loss due to elevation = (815-775.50) = 39.5 feet
Total Dynamic Head (TDH) = 41.3 Feet
Proposed duplex submersible pumps HOMA Model AMS434-200/7,5T/C 275 gpm and a TDH = 41.5 feet See Figure 13
Use 273 gpm at 41.3 feet TDH

See Figure 13 Proposed Pump Curve for a HOMA Model AMS434-200/7,5T/C.

City of Buchanan Water System

The City of Buchanan water supply is currently served by four wells with a combined pumping capacity of 3330 gallons per minute and a firm capacity with the largest well out of service of 2311 gpm prior to being treated at the City's water treatment plant. The City has two water towers with a combined capacity of 0.75 million gallons. The existing water system has the capacity to serve the Bertrand Township Industrial Campus water supply needs should the Industrial Campus be served by the City of Buchanan vs. the City of Niles.

City of Buchanan and Buchanan Township Sewer Capacities

Jones & Henry reviewed both City of Buchanan's and Buchanan Townships's downstream sewer capacities to determine if the downstream infrastructure is capable of handling the future sanitary sewer flow from the Bertrand Township Industrial Campus. We also reviewed the City's Schirmer lift station which is downstream of the proposed connection point to determine if any immediate upgrades are required to the lift station. An additional 33 gpm to 75 gpm can be expected to flow through the Shirmer pump station once Bertrand Township Industrial Campus is redirected to the City of Buchanan.

The Shirmer Street pump station has two 20 HP pumps each capable of pumping 375 gpm at 75' TDH through a 4-inch force main discharging to the gravity sewer on Fulton Street.

Therefore, both the downstream sewer system and Schirmer lift station appear to have enough immediate capacity to accommodate the additional flows from the Bertrand Township Industrial Campus once the flow arrives to the proposed connection point. No new upgrades or improvements are anticipated to handle the additional flows other than the improvements previously identified in this report.

City of Buchanan Wastewater Treatment Plant (WWTP) Capacity

The City of Buchanan wastewater treatment plant (WWTP) on average was treating 900,000 gallons per day to 1,100,000 gallons per day prior to recent improvements. The City recently replaced sanitary sewers in the downtown area. The replaced sewers were located beneath the water table and a significant source of infiltration and Inflow (I/I).

Upon completion of the project, the City's WWTP is currently treating on average 500,000 gallons per day due to the recent repairs. The future flows from Bertrand Township Industrial Complex could add another 163,114 gallons per day, which is well within the current treatment capacity of the wastewater treatment plant. Therefore, no improvements are anticipated to the City's WWTP should the Bertrand Township Industrial Campus sewer flows be redirected to the City of Buchanan's WWTP.

Infrastructure Costs and Future Management

It our understanding the improvements outlined in this report will be paid with funds by Bertrand Township with the City of Buchanan open to managing the new customers and operation and maintenance of the infrastructure improvements.

Engineer's Opinion of Probable Costs

Engineer's Estimate of Probable Construction Cost

City of Buchanan

Water & Sewer Feasibility Study

August 7, 2025

Project No. 382.8269-100_200

Item No.	Description	Quantity	Unit	Estimated Cost/Unit	Total Estimated Cost of Item
1	General Conditions/Mobilization	1	LS	$454,238.00	$454,238.00
2	Traffic Control	1	LS	$25,000.00	$25,000.00
3	Audio/Video Recording	1	LS	$4,000.00	$4,000.00
4	Trench Repair	400	SY	$120.00	$48,000.00
5	Cold Milling	4,935	SY	$8.00	$39,480.00
6	Directional Drilling 20-inch Steel Casing	520	LF	$350.00	$182,000.00
7	12" Ductile Iron Water Main	4,220	LF	$75.00	$316,500.00
8	12" 45 Degree Bend	6	EA	$500.00	$3,000.00
9	Air Release Valve - 8 Inch	2	EA	$12,000.00	$24,000.00
10	Gate Valve - 12 inch	4	EA	$2,500.00	$10,000.00
11	8-inch SDR 26 Sanitary Sewer	2,960	LF	$135.00	$399,600.00
12	8" C900 PVC Force Main	8,372	LF	$100.00	$837,200.00
13	1" Water Services	40	EA	$4,000.00	$160,000.00
14	6" Sanitary Sewer Lead	1,320	LF	$80.00	$105,600.00
15	4' Diameter Sanitary Manhole	10	EA	$4,000.00	$40,000.00
16	HMA MDOT 5EML Wearing Course 2-inch thickness	2,000	SY	$30.00	$60,000.00
17	HMA MDOT 4EML Leveling Course 2-inch thickness	2,000	SY	$17.00	$34,000.00
18	HMA MDOT 3EML Base Course 2-inch thickness	2,000	SY	$17.00	$34,000.00
19	Fire Hydrant	9	EA	$5,000.00	$45,000.00
20	Sanitary Pump Station - Foundation Drive	1	LS	$200,000.00	$200,000.00
21	Sanitary Pump Station - Chamberlain Road	1	LS	$800,000.00	$800,000.00
22	Water Booster Pump Station - Chamberlain Road	1	LS	$1,000,000.00	$1,000,000.00
23	Restoration	1	LS	$60,000.00	$60,000.00
24	Materials Testing	1	LS	$40,000.00	$40,000.00
25	Laboratory Services	1	LS	$25,000.00	$25,000.00
26	Construction Staking	1	LS	$50,000.00	$50,000.00
				Subtotal	$4,996,618.00
				Contingency 20%	$999,323.60
				Use:	**$6,000,000.00**

FIGURE 1

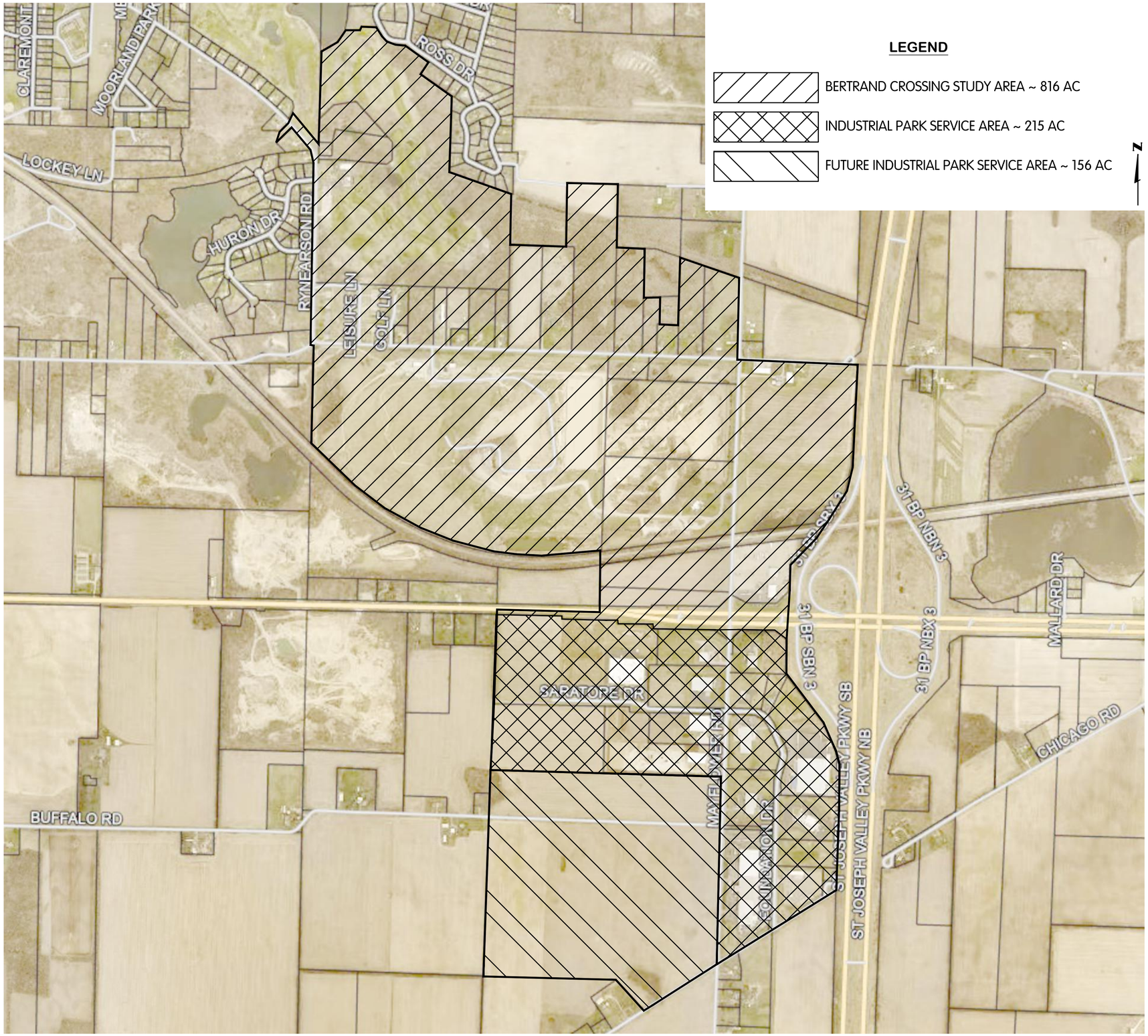


FIGURE 1 STUDY AREA

CITY OF BUCHANAN, MICHIGAN
WATER & SEWER UTILITY EXTENSION FEASIBILITY STUDY

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
1			
2			
3			
4			
5			

Jones & Henry Engineers, Ltd.
Fluid thinking©.
www.JHeng.com

JOB NO. 392-8269.100

SCALE 1"=600'

THIS LINE SCALES 1" WHEN PLOTTED TO NOTED SCALE

DESIGNED	DRAWN	CHECKED
RGE	CJAF	

STATUS: PRELIMINARY

DATE: AUGUST 2025

SHEET NO.

FIGURE 01

X OF X

K:\AL-8269\00\MAPS-FI\FIGURE 1
8/14/2025 12:00 PM - CFERRELL
8/14/2025 12:00 PM

FIGURE 2

BUCHANAN, MI
WATER & SEWER UTILITY
EXTENSION FEASIBILITY STUDY

WATER IMPROVEMENTS

Jones & Henry Engineers, Ltd.
www.JHeng.com
Fluid thinking...

FIGURE 2

SCALE: 1" = 12,000'

THIS LINE SCALES 1" WHEN PLOTTED TO NOTED SCALE

LEGEND

EXISTING WATER

PROPOSED WATER

PROPOSED BOOSTER PUMP STATION

CONNECTION POINT END OF EX. 12-INCH WATER MAIN

BORE AND JACK 120' 20-INCH STEEL CASING

BORE AND JACK 140' 20-INCH STEEL CASING

CONNECTION POINT END OF EX. 12-INCH WATER MAIN

EXISTING 16-INCH WATER MAIN FROM THE CITY OF NILES

EXISTING 12-INCH WATERMAIN

WATER TOWER 300,000 GALLON SPHEROID TANK
OVERFLOW EL. 941
HWL EL. 940
LWL EL. 910
BASE EL. 812

BERTRAND TOWNSHIP FIRE DISTRICT II

LAND FILL

AMTRAK R.R.

31 BP NBN

31 BP SBN 5

31 BP NBX 3

31 BP SBX 3

31 BP SBN 3

W US 12

ST JOSEPH VALLEY PKWY NB

ST JOSEPH VALLEY PKWY SB

MAYFLOWER RD

CHAMBERLAIN RD

FOUNDATION DR

SARATORE DR

S. CHICAGO ROAD

BUFFALO RD

GOLF LN

LEISURE LN

RYNEARSON RD

HURON

ONTARIO

KNIGHT DR

CENTER DR

ROSS DR

794 EL

783.6 EL

812 EL

796 EL

804 EL

812.6 EL

910 EL

769 EL

825 EL

FIGURE 3

DIXON ENGINEERING, INC.

STEEL TANK FIELD INSPECTION REPORT

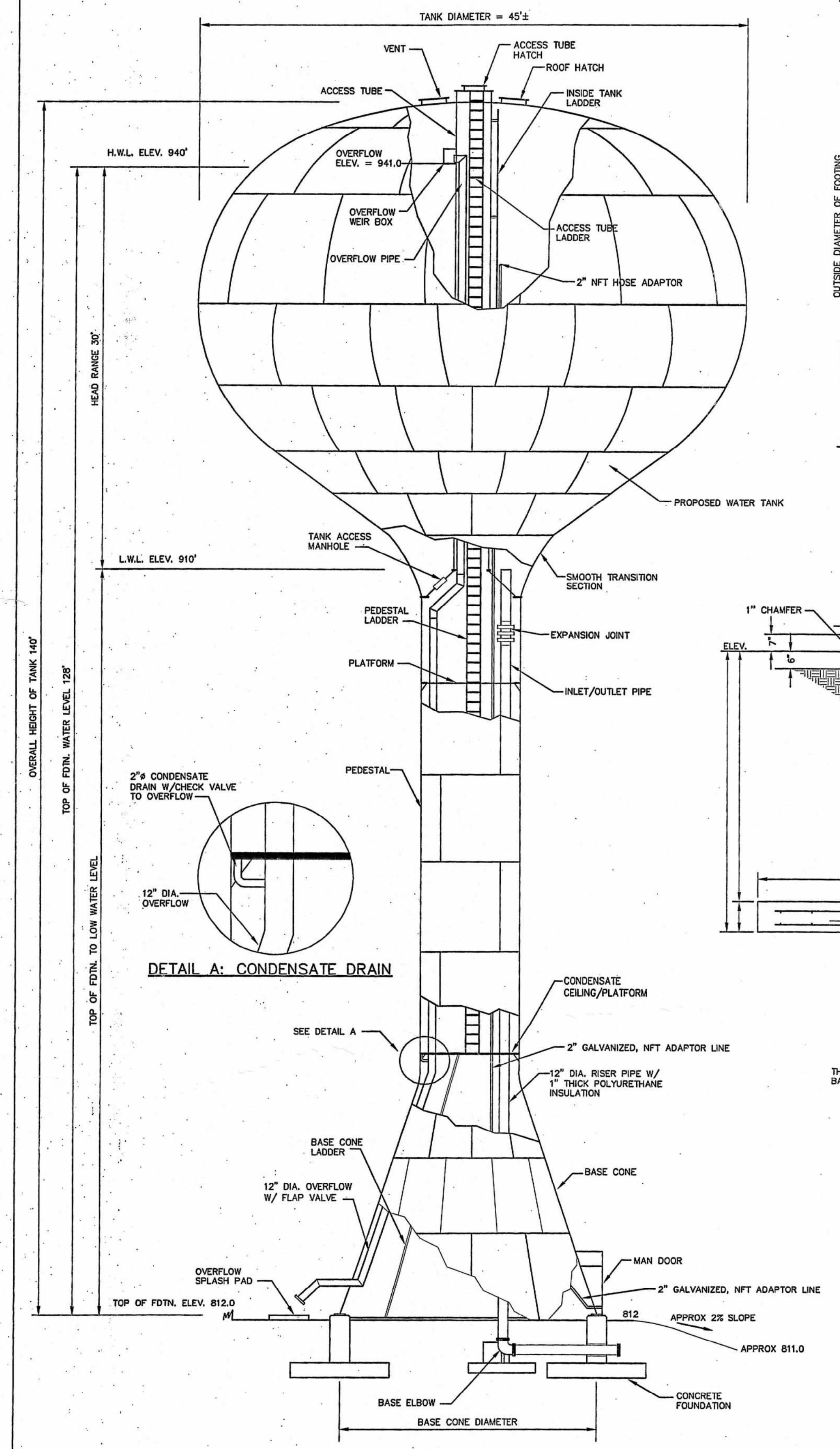
PEDESTAL TANK

DATE: **October 26, 2016**

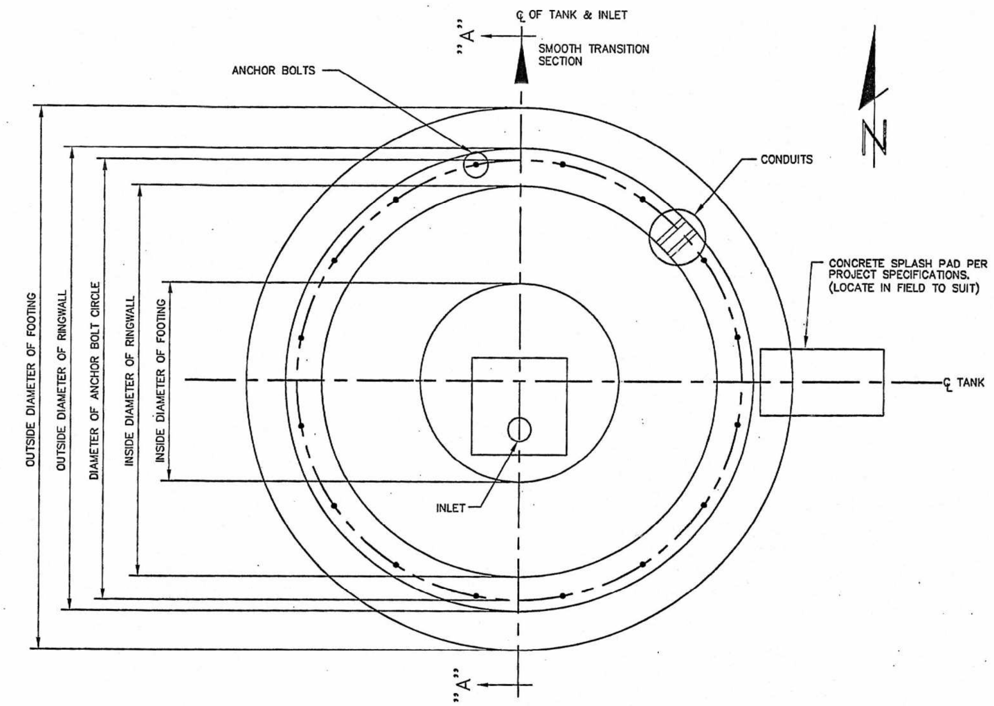
OWNER: **City of Niles**
CLIENT CODE: **22-11-62-02**
TANK NAME: **Bertrand Crossing**
LOCATION: Street: **2895 W. Chicago Road**
City: **Bertrand Township**
State: **Michigan**
TANK SIZE: Capacity: **300,000 gallons**
Tank Diameter: **48 feet (estimated)**
Height to bottom (LWL): **95.5 feet (from nameplate)**
Height to overflow (HWL): **125.5 feet (estimated)**
Head range: **30 feet (estimated)**
CONSTRUCTION:
Type of structure: **Spheroid**
Type of roof: **Hemisphere**
Type of bowl: **Hemisphere**
DATE CONSTRUCTED: **2004**
MANUFACTURER: **CB&I (Horton)**
CONTRACT NUMBER: **142357**

COATING HISTORY	EXTERIOR	WET INTERIOR	DRY INTERIOR
DATE LAST COATED	**2004/2005**	**2004/2005**	**2004/2005**
CONTRACTOR	**CB & I**	**CB & I**	**CB & I**
COATING SYSTEM	**Series 20**	**Series 20**	**Series 20**
SURFACE PREPARATION	**SSPC-SP6**	**SSPC-SP10**	**SSPC-SP6**
COATING MANUFACTURER	**Tnemec**	**Tnemec**	**Tnemec**
COATING SAMPLES	**No**	**No**	**No**
HEAVY METAL	**No**	**No**	**No**

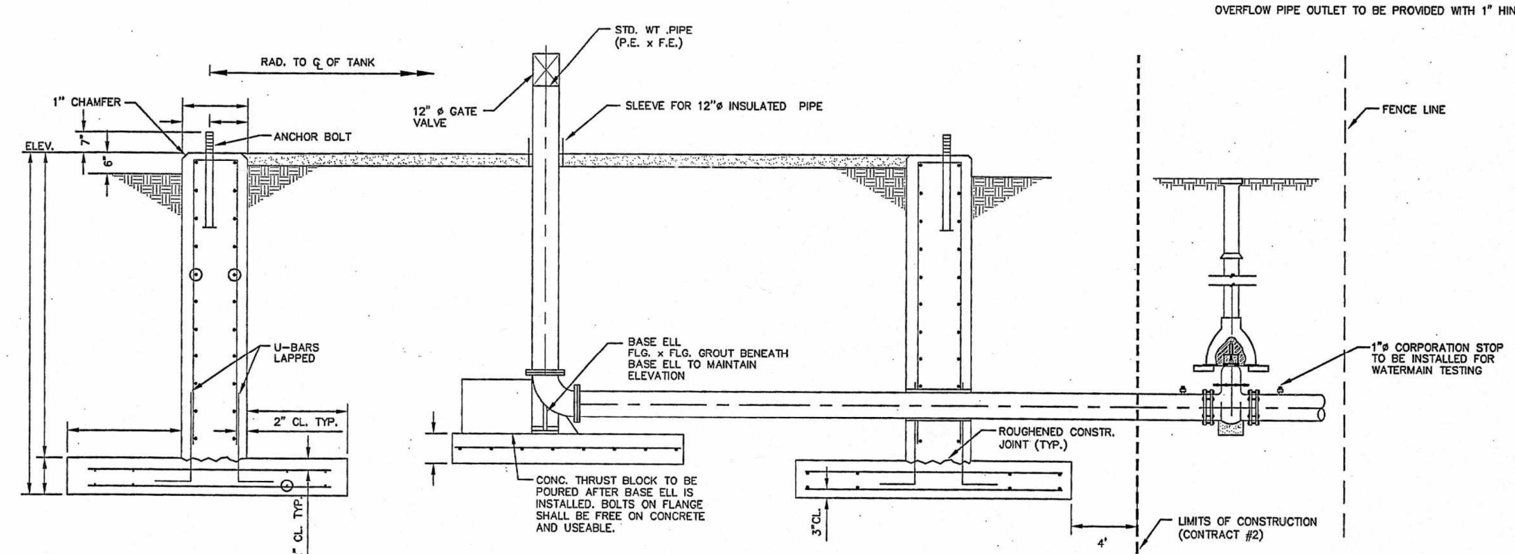
300,000 gallon spheroid owned by Bertrand Township.



ELEVATION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE



FOUNDATION SECTION "A–A"
NOT TO SCALE

NOTES:

DESIGN:
TANK AND SUPPORT STRUCTURE DESIGNED, FABRICATED AND ERECTED IN ACCORDANCE WITH AWWA D100–96 AND THE PROJECT SPECIFICATIONS.

TANK ERECTOR SHALL GROUT UNDER BASE PLATE RING.

MATERIALS:
STEEL PLATE: ASTM A283 GR.C / A36
STRUCTURAL STEEL SHAPES: ASTM A36
LADDER RUNGS: ASTM A706

GENERAL:
ACCESSORIES SHOWN ON ELEVATION DRAWING ARE ROTATED FOR CLARITY.

ALL HANDRAILS, PLATFORM LANDINGS, WALKWAYS, LADDERS, AND SAFETY CLIMB DEVICES SHALL CONFORM WITH CURRENT OSHA STANDARDS.

SEE PROJECT SPECIFICATIONS FOR SHOP AND FIELD PAINT REQUIREMENTS.

STERILIZE TANK IN ACCORDANCE WITH AWWA C652–92 AND PROJECT SPECIFICATIONS.

FOUNDATION NOTES:
FOUNDATION CONSTRUCTION SHALL COMPLY WITH A.C.I. 318–95, A.C.I. 301–96, AWWA D100–96, AND APPLICABLE SECTIONS OF THE PROJECT SPECIFICATIONS AND THE PROJECT SOILS REPORT.

FOUNDATION DESIGN WILL BE THE RESPONSIBILITY OF THE TANK CONTRACTOR.

CONCRETE COMPRESSIVE STRENGTH SHALL BE 4,000 P.S.I. AT 28 DAYS. REINFORCEMENT SHALL CONFORM TO ASTM A615 GR. 60.

CONSTRUCTION JOINTS SHALL BE ROUGHENED ACROSS ENTIRE FACE WITH 1/4" MINIMUM DEPTH INDENTATIONS.

THE TOP OF THE RINGWALL SHALL BE LEVEL WITHIN (±) 1/8" IN 30 FEET WITH A MAXIMUM DIFFERENTIAL OF (±) 1/4" BETWEEN ANY TWO POINTS ON THE CIRCUMFERENCE.

ANCHOR BOLTS SHALL BE PLACED WITHIN 1/8" OF THE PLAN DIMENSIONS, PLUMB WITHIN 1/4" IN 12" AND EXTEND ABOVE THE TOP OF FOUNDATION TO WITHIN 1/2" OF THE SPECIFIED PROJECTION.

PROVIDE 1/2" THICK EXPANSION JOINT MATERIAL BETWEEN FLOOR, WALL AND PIPING PENETRATIONS.

THICKEN FLOOR AND PROVIDE ADDITIONAL REINFORCEMENT WHERE ADDITIONAL LOADS BEAR.

NOTES:

FOUNDATION DESIGN WILL BE THE RESPONSIBILITY OF THE TANK CONTRACTOR.

FOUNDATION CONSTRUCTION SHALL COMPLY WITH AWWA D100–96, A.C.I. 318–95, A.C.I. 301–96 AND APPLICABLE SECTIONS OF THE PROJECT SPECIFICATIONS AND THE PROJECT SOILS REPORT.

CONCRETE COMPRESSIVE STRENGTH SHALL BE 4,000 PSI @ 28 DAYS.

REINFORCEMENT SHALL CONFORM TO A.S.T.M. A615 GR. 60.

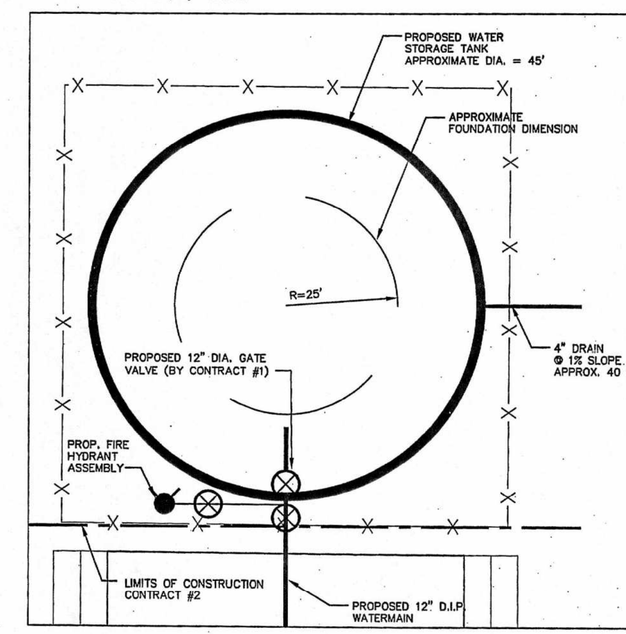
CONSTRUCTION JOINTS SHALL BE ROUGHENED ACROSS ENTIRE FACE WITH 1/4" MINIMUM DEPTH INDENTATIONS.

ANCHOR BOLTS, ANCHOR BARS, VERTICAL STEEL PIPE, AND D.I. BASE ELL TO BE FURNISHED BY THE TANK CONTRACTORS.

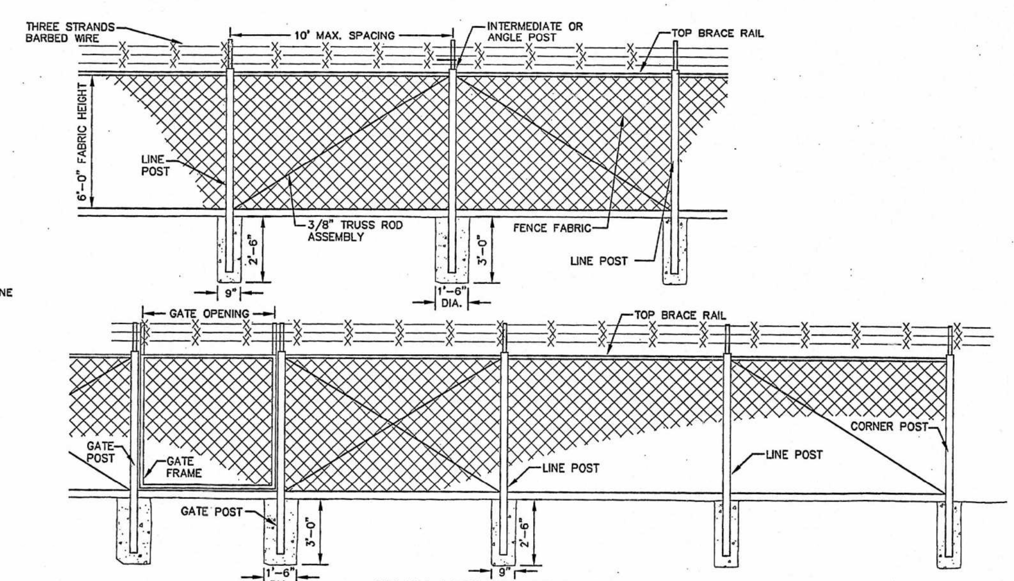
THE TOP OF CONCRETE FOR ALL PIERS INCLUDING THE CENTER PIER SHALL BE LEVEL AND SHALL BE THE SAME ELEVATION (UNLESS OTHERWISE NOTED BY A SPECIFIED ELEV.) WITH A MAXIMUM DIFFERENTIAL OF (+–) 1/4".

ANCHOR BOLTS SHALL BE PLACED WITHIN (+–) 1/8" OF THE PLAN DIMENSIONS AT THE TOP OF THE CONCRETE, PLUMB WITHIN 1/4" IN 12" AND EXTEND WITHIN 1/2" OF THE SPECIFIED PROJECTION ABOVE THE TOP OF THE FOUNDATION.

OVERFLOW PIPE OUTLET TO BE PROVIDED WITH 1" HINGED STEEL MESH SLOTTED SCREEN, W/PADLOCK.



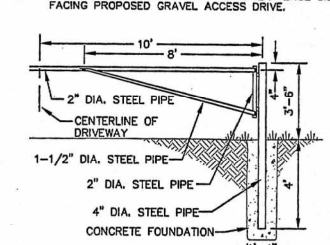
WATER TOWER VALVE & HYDRANT
SCALE: 1"=10'



CHAIN LINK FENCE DETAIL
NOT TO SCALE

NOTES (FOR GATE CONSTRUCTION)

1. ALL PIPE SHALL BE SCHEDULE 40.
2. ALL JOINTS SHALL BE MADE BY CONTINUOUS WELDS.
3. PAINT ALL PIPE FOREST GREEN AFTER FABRICATION.
4. FILL GATE POSTS WITH CONCRETE.
5. DETAIL SHOWS ONLY ONE SIDE OF GATE.
6. GATE SHALL BE PLACED ON THE TOWER FENCE SIDE FACING PROPOSED GRAVEL ACCESS DRIVE.



SWING GATE DETAIL
NOT TO SCALE

NO.	REVISION DESCRIPTION:	BY:	DATE:

BERTRAND TOWNSHIP
BERRIEN COUNTY, MICHIGAN

ABONMARCHE CONSULTANTS, INC.
95 West Main Street
Benton Harbor, Michigan
T 269.927.2295
F 269.927.1017
E ACI@ABONMARCHE.COM
Manistee, Michigan
Grand Haven, Michigan
Indianapolis, Indiana
South Bend, Indiana
Fort Wayne, Indiana
ENGINEERS / ARCHITECTS / PLANNERS / SURVEYORS

DRAWING TITLE:
CONTRACT #1 & #2
PROPOSED WATER STORAGE TANK
LAYOUT & STANDARD DETAILS

STATE OF MICHIGAN — CHRISTOPHER J. COOK ENGINEER No. 37166 — LICENSED PROFESSIONAL ENGINEER

SCALES: VERTICAL: N/A HORIZONTAL: N/A	SHEET 5
DATE: MARCH 2004	
DESIGNED: DV	
DRAWN: TRT	
APPROVED: CJC	
JOB NO. M3–0914tk	OF 6 SHEETS

FIGURE 4

BUCHANAN, MI
WATER & SEWER UTILITY
EXTENSION FEASIBILITY STUDY

SEWER IMPROVEMENTS

Jones & Henry Engineers, Ltd.
www.JHeng.com
Fluid thinking...

FIGURE 4

SCALE: 1" = 12,000'

THIS LINE SCALES 1" WHEN PLOTTED TO NOTED SCALE

LEGEND
- EXISTING FORCE MAIN
- PROPOSED FORCE MAIN
- EXISTING SEWER
- PROPOSED SEWER

EXISTING 8-INCH FORCE MAIN TO THE CITY OF NILES
EXISTING PUMP STATION NO. 1
PROPOSED 8-INCH FORCEMAIN
PROPOSED PUMP STATION NO. 2
PROPOSED 8-INCH FORCEMAIN
PROPOSED AIR RELEASE VALVE
JACK AND BORE 120' 20-INCH STEEL CASING
PROPOSED AIR RELEASE VALVE
JACK AND BORE 140' 20-INCH STEEL CASING
PROPOSED ALTERNATE 8-INCH GRAVITY SEWER
PROPOSED 8-INCH GRAVITY SEWER
CONNECTION POINT EX. SAN MH NO. 14 8-INCH INV. 856.70
PROPOSED 8-INCH GRAVITY SEWER
PROPOSED AIR RELEASE VALVE
EX. 3-INCH FORCEMAIN PRIVATE PUMP STATION
CRESCENT VIEW PUMP STATION
LAND FILL
AMTRAK R.R.
BERTRAND TOWNSHIP FIRE DISTRICT II
783.6 EL
794 EL
796 EL
804 EL
812 EL
812.6 EL
769 EL
825 EL
910 EL
W US 12
31 BP NEX 3
31 BP SBX 3
31 BP SBN 3
31 BP NB
31 BP SBN 5
ST JOSEPH VALLEY PKWY NB
ST JOSEPH VALLEY PKWY SB
MAYFLOWER RD
FOUNDATION DR
S. CHICAGO ROAD
CHAMBERLAIN RD
SARATOGA DR
BUFFALO RD
RYNEARSON RD
HURON DR
ONTARIO
LEISURE LN
GOLF LN
BROOKWOOD
KNIGHT DR
CENTER DR
ROSS DR

FIGURE 5

BERTRAND CROSSING UTILITIES AND PHASE 1 SITE IMPROVEMENTS

BERTRAND TOWNSHIP,BERRIEN COUNTY,MICHIGAN

PROJECT DEVELOPED BY:

BERTRAND TOWNSHIP , CITY OF NILES AND THE
GREATER NILES ECONOMIC DEVELOPMENT FOUNDATION

PROJECT FUNDED IN PART BY A GRANT FROM THE U.S. ECONOMIC
DEVELOPMENT ADMINISTRATION & THE COMNUNITY DEVELOPMENT BLOCK PROGRAM
EDA PROJECT NO.: 06-01-02777
EDA GRANT AMOUNT: $579,250
CDBG PROJECT NO.: MSC940006 EDIG

NOTES

PUBLIC UTILITY STATEMENT– ALL WATERMAIN SANITARY SEWERS, PUMPING STATION & FORCE MAIN FOR THIS PROJECT ARE DESIGNED FOR AND WILL BE A PUBLIC SYSTEM UPON APPROVAL BY THE OWNER.

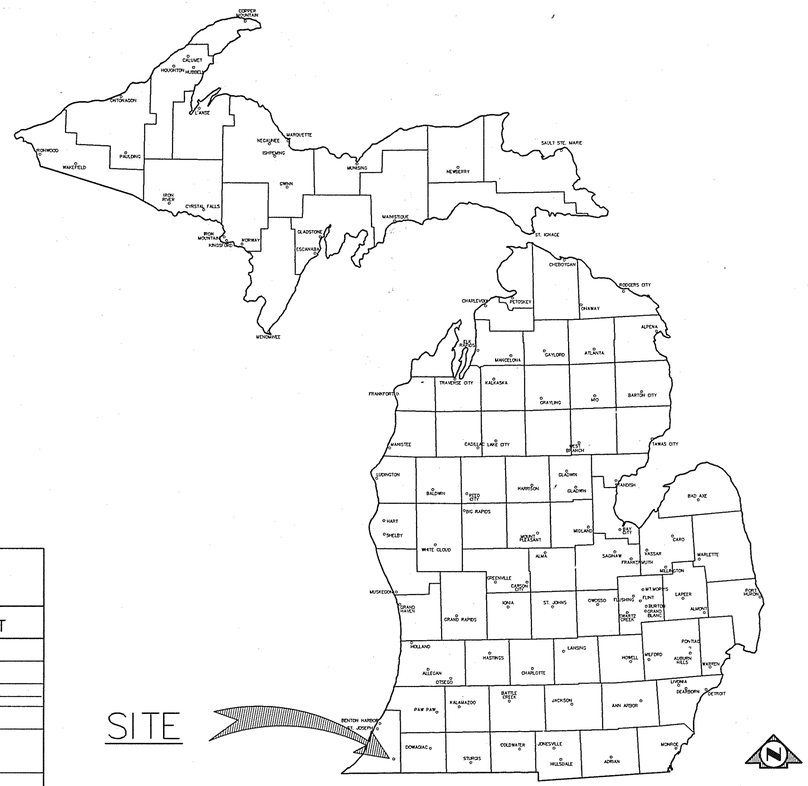
EASEMENT STATEMENT– ALL PUBLIC UTILITIES SHALL HAVE AN EASEMENT GRANTED OR BE CONSTRUCTED BY PERMIT IN PUBLIC RIGHT OF WAY . THE EASEMENT AND PERMIT ARE GRANTED TO THE MUNICIPALITY RESPONSIBLE FOR MAINTENANCE,REPAIR AND/ OR REPLACEMENT.

UTILITY WARNING– A MINIMUM OF 72 HOURS PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY "MISS DIG" (1-800-482-7171) AND REQUEST ALL UNDERGROUND UTILITIES TO BE STAKED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND/OR RELOCATION OF ALL UTILITIES THAT MAY INTERFERE WITH CONSTRUCTION.

N.P.E.D.S. STORMWATER– THE TOTAL DISTURBED AREA FOR THIS PROJECT IS 4.3 ACRES. A PERMIT FROM MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY IS NOT REQUIRED.

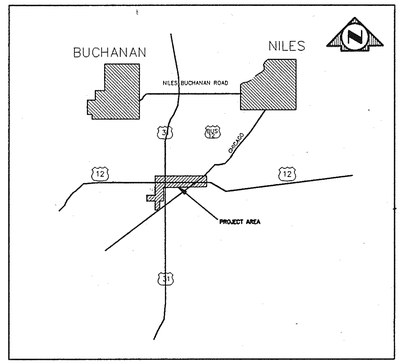
PLAN DISTRIBUTION

AGENCY	CONTACT PERSON	PHONE NO.	COPIES	DATE SENT
BERRIEN CO ROAD COMMISSION	MIKE RUSHLOW	616-925-1196	1	4-15-96
BERRIEN CO DRAIN COMMISSION	LOWELL BRUCE	616-983-7111	1	4-15-96
CITY OF NILES-ENGINEERING	NEIL COULSTON	616-683-4700	1	4-15-96
CITY OF NILES - UTILITIES	BRIAN DAY	616-683-4700	1	4-15-96
BERTRAND TOWNSHIP	RICHARD NELSON	616-684-2572	1	4-15-96
GREATER NILES ECONOMIC DEVELOPMENT FOUNDATION	CHRIS BYRNES	616-683-1833	1	4-15-96
MICHIGAN DEPARTMENT OF TRANSPORTATION	STEVE SERDEL	616-337-3933	1	4-15-96
MICHIGAN DEPARTMENT OF PUBLIC HEALTH	DIANE HOLMAN	517-335-9609	2	4-15-96
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	PLAINWELL DISTRICT OFFICE GREG DANNEFFEL P.E.	616-685-0030	2	4-15-96



GENERAL LOCATION MAP

NO SCALE



LOCATION MAP

NO SCALE

SHEET INDEX

REVISIONS			
NO.	DATE	DESCRIPTION	BY
1	7/9/96	D.E.Q. COMMENTS	K.B.
2	7/26/96	D.E.Q. COMMENTS	K.B.

AS BUILT 11/13/97

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171

PLAN NO. f10242
DATE: APRIL 15,1996
DRAWN BY: K.B.
CHECKED BY: R.C.J.
SCALE:

PREPARED BY
ROWE ENGINEERING INC.
FLUSHING 1449 E. Pierson 810-659-3103
CORUNNA 112 E. McArthur 517-743-6363
CARO 166 N. State 517-673-2636
Mt. PLEASANT 127 S. Main 517-772-2138

COVER SHEET
BERTRAND CROSSING
BERTRAND TOWNSHIP, CITY OF NILES, AND
GREATER NILES ECONOMIC DEVELOPMENT FOUNDATION

REI

1 OF 24

This drawing was computer generated. Any changes and/or revisions should be made to the CADD drawing file. The CADD drawing is the original.

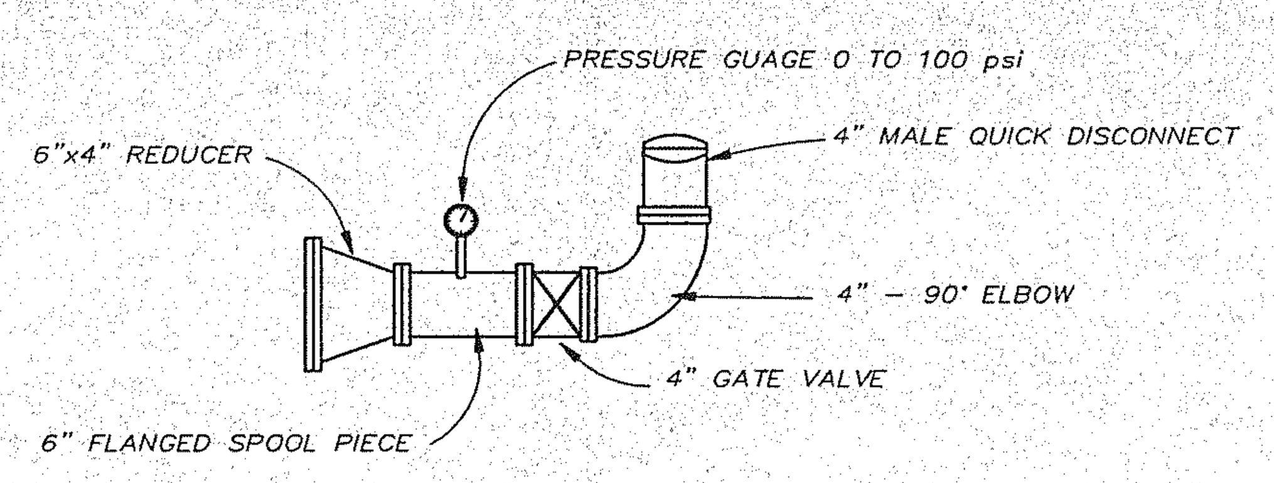
Cad No: I0242C01
Job No: FI0242

PUMP OPERATION SCHEDULE

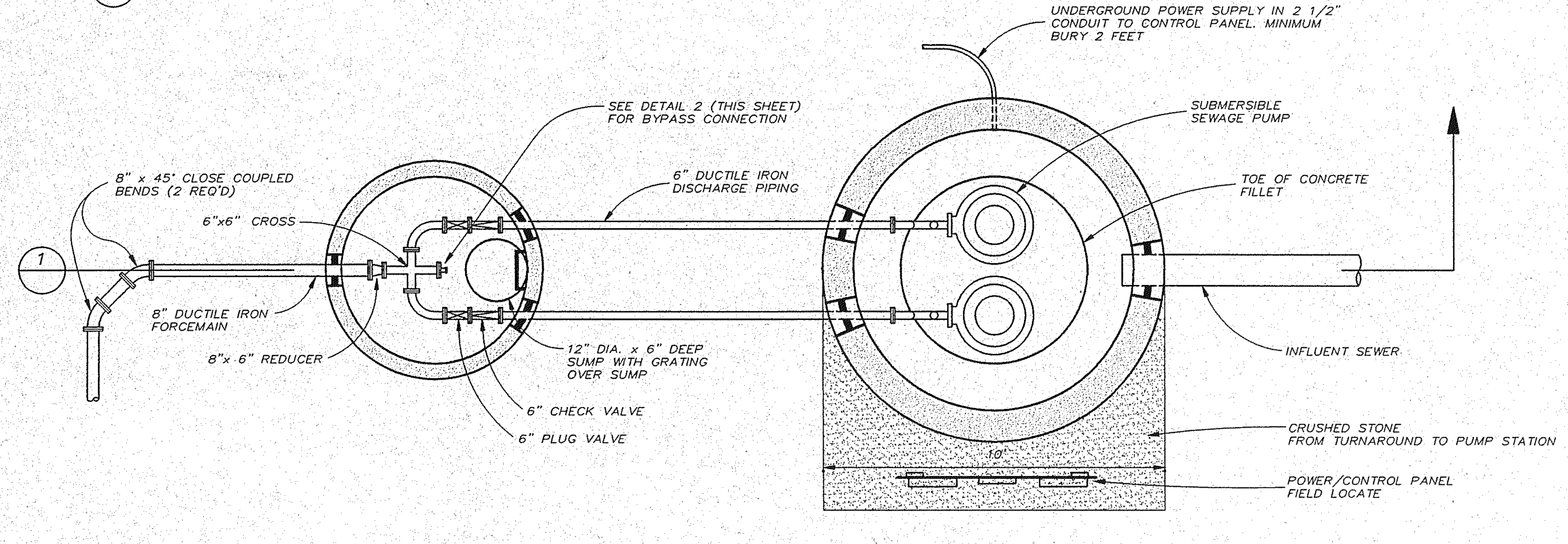
Float Switch (beginning at bottom)	Operation	Level
1	All pumps off plus alarm	773.5
2	All pumps off	774.5
3	Lead pump on	777.0
4	Lag pump on & high alarm Alarm	778.0

NOTE:

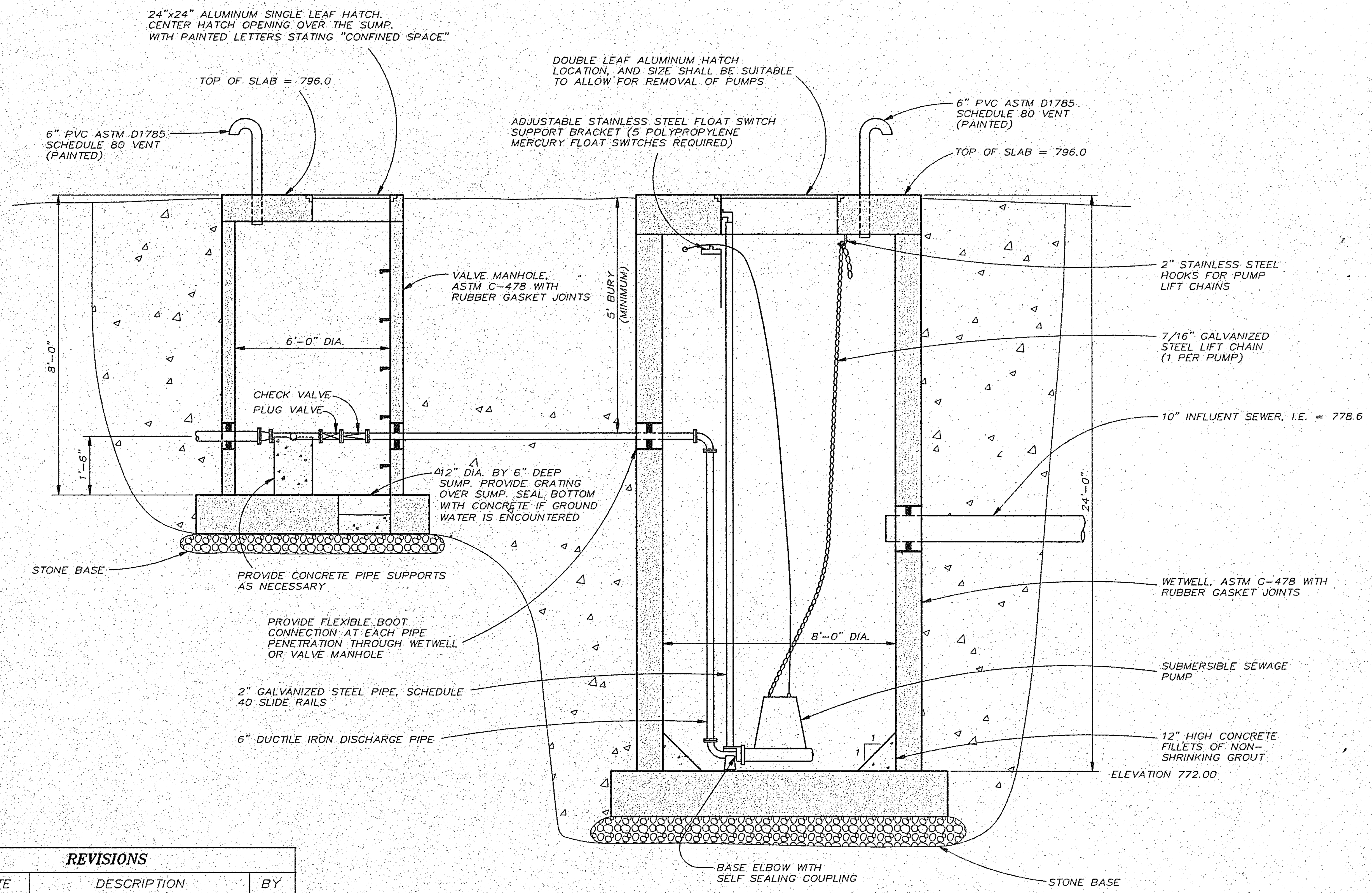
Float switch level settings shown are for information only. These may be adjusted during start-up by the Engineer.



(2) DETAIL OF BYPASS CONNECTION



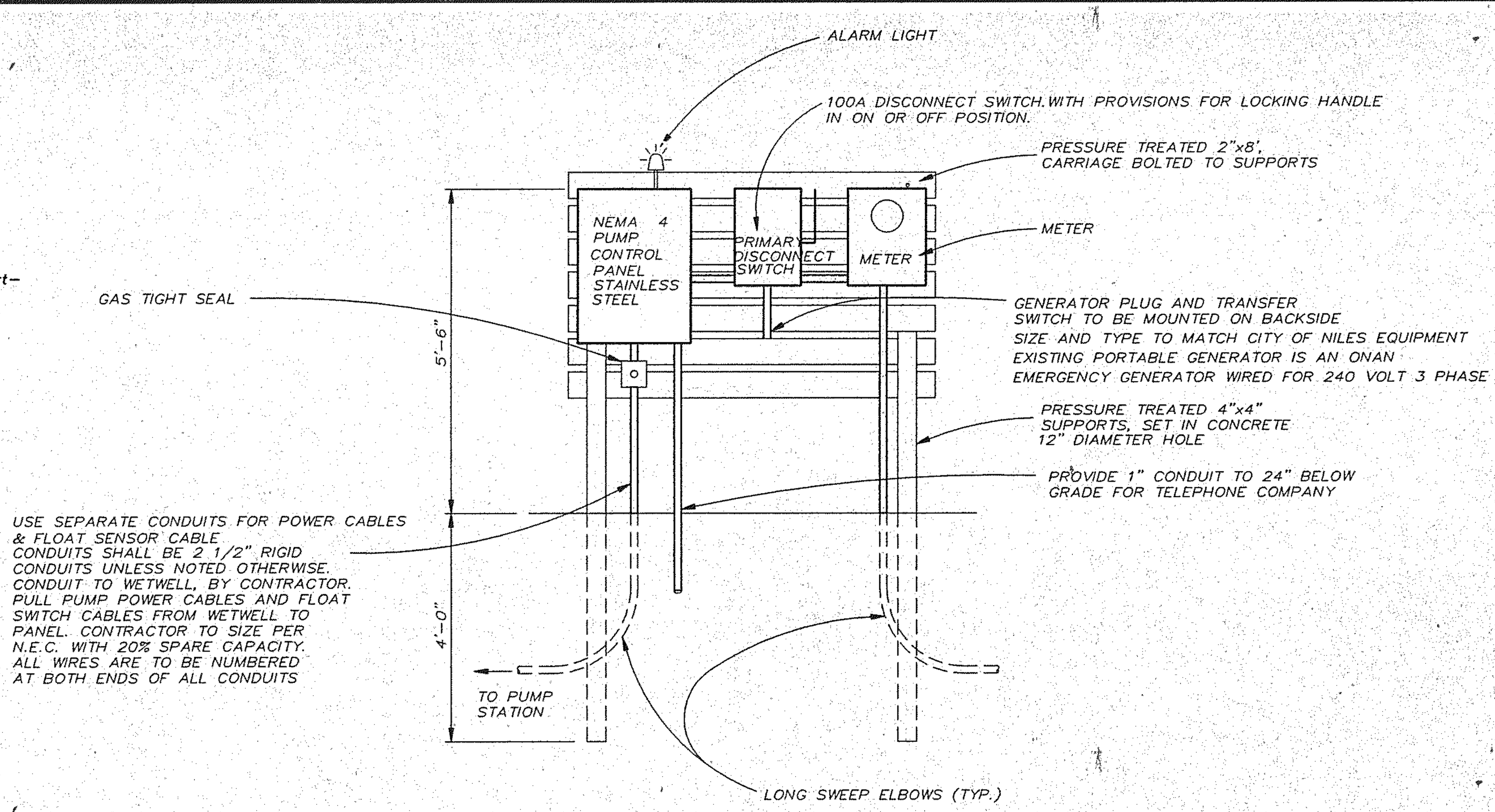
PLAN VIEW - BELOW GRADE



REVISIONS

NO.	DATE	DESCRIPTION	BY
1	7/9/96	D.E.Q. COMMENT	K.B.

(1) CROSS-SECTION



POWER / CONTROL PANEL

PANEL LOCATION TO BE FIELD VERIFIED

SUBMERSIBLE WASTEWATER PUMPING STATION ELECTRICAL NOTES:

1. ELECTRIC SERVICE FROM THE TRANSFORMER TO THE METER SOCKET WILL BE INSTALLED BY THE LOCAL POWER COMPANY. THE CONTRACTOR SHALL ARRANGE FOR THE POWER TO THE SERVICE METER AND SHALL PAY ALL COSTS.
2. THE FINAL LOCATION OF THE METER PEDESTAL SHALL BE DETERMINED IN THE FIELD BY THE OWNER, THE ENGINEER AND THE UTILITY COMPANY.
3. CONTRACTOR SHALL VERIFY THE AVAILABILITY OF 3 PHASE 240 VOLT POWER SUPPLY WITH THE UTILITY COMPANY. ANY LINE EXTENSIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. ALL ELECTRICAL EQUIPMENT SHALL HAVE SHOP DRAWING APPROVAL BY THE ENGINEER PRIOR TO THE CONTRACTOR ORDERING THE MATERIAL.
5. THE CONTRACTOR SHALL CONFORM TO ALL ELECTRICAL CODES AND SHALL ARRANGE FOR THE REQUIRED STATE SAFETY INSPECTION PRIOR TO ENERGIZING THE PUMP STATION.

PUMP STATION DATA

1. LOCATION - LOT 1 OF BERTRAND CROSSING IN SECTION 5 OF BERTRAND TOWNSHIP BERRIEN COUNTY.
2. STATION TYPE - WET WELL; DUAL SUBMERSIBLE.
3. POWER SUPPLY - 3 PHASE, 60 HERTZ, 240 VOLT, 3 WIRE.
4. SERVICE AREA - 86 ACRES PHASE I, AND 160 ADDITIONAL ACRES PHASE II.
5. SEWAGE FLOW PHASE I - 116.5 GPM AVG., 233 GPM PEAK.
6. SEWAGE FLOW PHASE II - 238.5 GPM AVG., 477 GPM PEAK.
7. FIRM PUMPING CAPACITY - 233 GPM INITIAL, 477 GPM FUTURE.
8. NUMBER OF PUMPS - 2 (ALTERNATING). PUMPS SHALL BE FLYGHT OR ABS.
9. PUMP CONTROLS - 5 POLYPROPYLENE MERCURY FLOAT SWITCHES.
10. SIZE AND MATERIAL FOR FORCEMAIN - 8" DUCTILE IRON, CLASS 52.
11. LENGTH OF FORCEMAIN - 5370 FT., STATIC HEAD 16.5
12. TOTAL DYNAMIC HEAD PHASE I - 26 FEET. TOTAL DYNAMIC HEAD PHASE II - 62 FEET.
13. MAXIMUM SPEED - 1750 RPM.
14. HORSEPOWER - 5 (FUTURE - 10 H.P.)
15. SOLIDS HANDLING - 3" DIAMETER SPHERE.
16. POWER - 240 VOLT, 3 PHASE.
17. MOTOR TYPE - SUBMERSIBLE, EXPLOSION PROOF, MEETING N.E.C. CLASS 1 DIV.1 AREAS.
18. CONTRACTOR SHALL SUPPLY THE CITY OF NILES WITH 3 COPIES OF O & M MANUALS & SHOP DRAWINGS.

PUMP CONTROL PANEL SCHEDULE

1. ENCLOSURE TYPE: NEMA 4 WITH INNER PANEL AND LOCKING HASP ON EXTERIOR DOOR. (STAINLESS STEEL) HINGE ON LEFT
2. MANUAL DISCONNECT (MOTOR PROTECTOR): ONE PER PUMP WITH THREE POLE ADJUSTABLE OVERLOAD PROTECTION AND INSTANTANEOUS MAGNETIC TRIP (SHORT CIRCUIT PROTECTION) WITH DOOR INTERLOCKING HANDLING.
3. MAGNETIC CONTACTOR: ONE PER PUMP, RATED FOR HORSEPOWER OF PUMPS SUPPLIED.
4. HAND-OFF-AUTOMATIC SELECTOR SWITCH: ONE PER PUMP.
5. AUTOMATIC ELECTRICAL ALTERNATOR: PROVIDE ALTERNATOR AND SWITCH TO ALLOW ANY OF THE FOLLOWING OPERATION SEQUENCES: 1) ALTERNATE LEAD PUMP WITH EACH CYCLE, 2) PUMP 1 LEADS, 3) PUMP 2 LEADS. USE WARRICK CONTROLS SERIES 67 INTRINSICALLY SAFE PUMP ALTERNATOR
6. PROVIDE 110V FOR CONTROL CIRCUIT AND RECEPTACLE CIRCUIT.
7. MOTOR THERMAL PROTECTION: ONE PER PUMP, SWITCHES WITH AUTOMATIC RESET TO SHUT DOWN IN EVENT OF HIGH TEMPERATURE.
8. CONTROL DISCONNECT (2-POLE, THERMAL MAGNETIC): YES.
9. SEAL WARNING SYSTEM: ONE PER PUMP; PROVIDE LOW VOLTAGE, LOW AMPERAGE SIGNAL TO PROBE IN PUMP. PROVIDE WARNING LAMP ON CONTROL PANEL FACE.
10. ELAPSED TIME METERS: ONE PER PUMP; SIX DIGIT, NON-RESETTABLE.
11. ALARMS: NEMA 4 WEATHERPROOF RED LIGHT MOUNTED ON TOP OF PANEL. PROVIDE ALTERNATIVE DIALER FOR REMOTE NOTIFICATION OF ALARM CONDITIONS. THE FOLLOWING CONDITIONS ARE CONSIDERED ALARM CONDITIONS: HIGH WETWELL, LOW WETWELL, AND POWER FAILURE. DIALER SHALL BE PHONETICS SENSAPHONE "DIALER EXPRESS MODEL 6500" PROVIDE BACKUP BATTERY AND PROGRAMMING MIC
12. LIGHTING ARRESTER (MOUNTED IN PANEL): YES.
13. SPACE HEATER WITH THERMOSTAT (MOUNTED IN PANEL): YES.
14. FLOAT SYSTEM: INTRINSICALLY SAFE FLOAT SYSTEM WITH SWITCHES FOR OPERATING STRATEGY SHOWN IN PUMP OPERATION SCHEDULE. ALL CONTROLS LOCATED IN THE WETWELL OR OPEN TO THE WETWELL SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.

EXISTING WESTERN ELECTRIC PUMPING STATION

THE CONTRACTOR SHALL MAXIMIZE THE STATION OUTPUT BY THE ADDITION OF LARGER IMPELLERS ETC. AN ALLOWANCE IS STATED IN THE PROPOSAL.

PLAN NO. F10242
DATE: APRIL 15, 1996
DRAWN BY: J.A.R.
CHECKED BY: J.E.R.
SCALE: AS SHOWN

PREPARED BY
ROWE ENGINEERING INC.
FLUSHING 1449 E. Pierson 810-659-3103
CORUNNA 112 E. McArthur 517-743-6363
CARO 166 N. State 517-673-2636
Mt. PLEASANT 127 S. Main 517-772-2138

PUMPING STATION PLAN

BERTRAND CROSSING

BERTRAND TOWNSHIP, CITY OF NILES, AND GREATER NILES ECONOMIC DEVELOPMENT FOUNDATION

Cad No: 10242-21
Job No: F10242

Current Directory: R:\PROJECT\F10242\10242-21

Plot Scale: 1"=2'-0" Last Update Made On 7/9/1996 At 3:55 P.M.

FIGURE 6

FINANCIAL REVIEW

of the

UTILITIES DEPARTMENT

City of Niles

Niles, MICHIGAN

Annual Report

Year Ended September 30, 2020

WATER PUMPED AND SOLD

	Cubic Feet		Gallons		CF Percent	
	2020	2019	2020	2019	2020	2019
City Sales	40,822,800	39,316,700	305,354,544	294,088,916	77.87%	76.48%
Niles Township	8,397,500	8,568,200	62,813,300	64,090,136	16.02%	16.67%
Howard Township	2,100,700	2,057,800	15,713,236	15,392,344	4.01%	4.00%
Bertrand-Commercial	124,900	80,800	934,252	604,384	0.24%	0.16%
Bertrand-Governmental	2,900	5,600	21,692	41,888	0.01%	0.01%
Bertrand-Industrial	495,200	603,000	3,704,096	4,510,440	0.94%	1.17%
Bertrand-LMC	26,000	28,500	194,480	213,180	0.05%	0.06%
Milton Township	77,100	122,500	576,708	916,300	0.15%	0.24%
Bulk Sales	257,800	540,900	1,928,344	4,045,932	0.49%	1.05%
Known System Loss: **						
Flushing and Backwashing	40,107	0	300,000	0	0.08%	0.00%
Water Tower Draining	10,027	13,369	75,000	100,000	0.02%	0.03%
Fire Suppression	31,586	19,337	236,265	144,640	0.06%	0.04%
Broken Mains	40,107	53,476	300,000	400,000	0.08%	0.10%
Estimated Loss	0	0	0	0	0.00%	0.00%
	52,426,727	51,410,182	392,151,917	384,548,160	100.00%	100.00%

FOR SEWAGE ONLY (Metered)

	Cubic Feet		Gallons		Percent	
	2020	2019	2020	2019	2020	2019
City	36,014,100	36,033,000	269,385,468	269,526,840	48.766%	47.959%
Landfill Leachate	180,200	165,300	1,347,896	1,236,444	0.244%	0.220%
Wholesale-Niles Twp	35,457,200	36,424,000	265,219,856	272,451,520	48.012%	48.480%
Wholesale-Howard Twp	1,550,500	1,792,100	11,597,740	13,404,908	2.099%	2.385%
Bertrand-Commercial	124,900	80,800	934,252	604,384	0.169%	0.108%
Bertrand-Governmental	2,900	5,600	21,692	41,888	0.004%	0.007%
Bertrand-Industrial	495,200	603,000	3,704,096	4,510,440	0.671%	0.803%
Bertrand-LMC	26,000	28,500	194,480	213,180	0.035%	0.038%
	73,851,000	75,132,300	552,405,480	561,989,604	100.000%	100.000%

NUMBER OF WATER AND SEWAGE ACTIVE ACCOUNTS

	2020	2019
City - Water with Sewage	4,144	4,212
City - Water Only	104	249
City - Sewage Only	4	4
Rural - Water with Sewage - Niles Township	9	10
Rural - Water with Sewage - Bertrand Township	17	16
Rural - Water Only - Niles Township	772	789
Rural - Water Only - Bertrand Township	1	0
Rural - Water Only - Howard Township	257	262
Rural - Water Only - Milton Township	3	3
Rural - Sewage Only - Niles Township	8	8
Rural - Sewage Only - Bertrand Township	1	1
Rural - Sewage Only - Howard Township	318	319
	5,638	5,873

Taps completed with meter settings 3

FINANCIAL REVIEW

of the

UTILITIES DEPARTMENT

City of Niles

Niles, MICHIGAN

Annual Report

Year Ended September 30, 2023

WATER PUMPED AND SOLD

	Cubic Feet		Gallons		CF Percent	
	2023	2022	2023	2022	2023	2022
City Sales	53,713,500	52,984,400	401,776,980	396,323,312	80.43%	81.30%
Niles Township	8,396,700	8,459,700	62,807,316	63,278,556	12.57%	12.98%
Howard Township	2,013,700	2,191,700	15,062,476	16,393,916	3.02%	3.36%
Bertrand-Commercial	340,500	386,600	2,546,940	2,891,768	0.51%	0.59%
Bertrand-Governmental	900	800	6,732	5,984	0.00%	0.00%
Bertrand-Industrial	1,547,700	309,100	11,576,796	2,312,068	2.32%	0.47%
Bertrand-LMC	26,500	24,500	198,220	183,260	0.04%	0.04%
Milton Township	105,900	86,300	792,132	645,524	0.16%	0.13%
Bulk Sales	12,473	572,360	93,300	4,281,255	0.02%	0.88%
Known System Loss: **						
Flushing and Backwashing	478,610	40,107	3,580,000	300,000	0.72%	0.06%
Water Tower Draining	53,476	33,422	400,000	250,000	0.08%	0.05%
Fire Suppression	62,513	16,965	467,600	126,900	0.09%	0.03%
Broken Mains	26,738	66,845	200,000	500,000	0.04%	0.10%
Estimated Loss	0	0	0	0	0.00%	0.00%
	66,779,210	65,172,800	499,508,492	487,492,543	100.00%	100.00%

FOR SEWAGE ONLY (Metered)

	Cubic Feet		Gallons		Percent	
	2023	2022	2023	2022	2023	2022
City	48,159,700	48,285,500	360,234,556	361,175,540	56.85%	58.10%
Landfill Leachate	125,000	174,600	935,000	1,306,008	0.15%	0.21%
Wholesale-Niles Twp	33,194,000	32,589,300	248,291,120	243,767,964	39.18%	39.21%
Wholesale-Howard Twp	1,326,200	1,335,500	9,919,976	9,989,540	1.57%	1.61%
Bertrand-Commercial	340,500	386,600	2,546,940	2,891,768	0.40%	0.47%
Bertrand-Governmental	900	800	6,732	5,984	0.00%	0.00%
Bertrand-Industrial	1,547,700	309,100	11,576,796	2,312,068	1.83%	0.37%
Bertrand-LMC	26,500	24,500	198,220	183,260	0.03%	0.03%
	84,720,500	83,105,900	633,709,340	621,632,132	100.00%	100.00%

NUMBER OF WATER AND SEWAGE ACTIVE ACCOUNTS

	2023	2022
City - Water with Sewage	4,234	4,244
City - Water Only	231	241
City - Sewage Only	5	4
Rural - Water with Sewage - Niles Township	10	10
Rural - Water with Sewage - Bertrand Township	15	15
Rural - Water Only - Niles Township	807	808
Rural - Water Only - Bertrand Township	3	4
Rural - Water Only - Howard Township	267	265
Rural - Water Only - Milton Township	4	3
Rural - Sewage Only - Niles Township	8	8
Rural - Sewage Only - Bertrand Township	1	1
Rural - Sewage Only - Howard Township	319	319
	5,904	5,922

Taps completed with meter settings 4

FINANCIAL REVIEW

of the

UTILITIES DEPARTMENT

City of Niles

Niles, MICHIGAN

Annual Report

Year Ended September 30, 2024

WATER PUMPED AND SOLD

	Cubic Feet		Gallons		CF Percent	
	2024	2023	2024	2023	2024	2023
City Sales	49,403,800	53,713,500	369,540,424	401,776,980	77.87%	80.43%
Niles Township	7,874,900	8,396,700	58,904,252	62,807,316	12.41%	12.57%
Howard Township	2,369,700	2,013,700	17,725,356	15,062,476	3.73%	3.02%
Bertrand-Commercial	291,500	340,500	2,180,420	2,546,940	0.46%	0.51%
Bertrand-Governmental	700	900	5,236	6,732	0.00%	0.00%
Bertrand-Industrial	2,051,500	1,547,700	15,345,220	11,576,796	3.23%	2.32%
Bertrand-LMC	26,000	26,500	194,480	198,220	0.04%	0.04%
Milton Township	46,900	105,900	350,812	792,132	0.07%	0.16%
Bulk Sales	794,100	12,473	5,939,868	93,300	1.25%	0.02%
Known System Loss: **						
Flushing and Backwashing	474,599	478,610	3,550,000	3,580,000	0.75%	0.72%
Water Tower Draining	40,107	53,476	300,000	400,000	0.06%	0.08%
Fire Suppression	47,259	62,513	353,500	467,600	0.07%	0.09%
Broken Mains	26,738	26,738	200,000	200,000	0.04%	0.04%
Estimated Loss	0	0	0	0	0.00%	0.00%
	63,447,803	66,779,210	474,589,568	499,508,492	100.00%	100.00%

FOR SEWAGE ONLY (Metered)

	Cubic Feet		Gallons		Percent	
	2024	2023	2024	2023	2024	2023
City	44,726,300	48,159,700	334,552,724	360,234,556	54.84%	56.85%
Landfill Leachate	153,900	125,000	1,151,172	935,000	0.19%	0.15%
Wholesale-Niles Twp	32,944,200	33,194,000	246,422,616	248,291,120	40.39%	39.18%
Wholesale-Howard Twp	1,365,500	1,326,200	10,213,940	9,919,976	1.67%	1.57%
Bertrand-Commercial	291,500	340,500	2,180,420	2,546,940	0.36%	0.40%
Bertrand-Governmental	700	900	5,236	6,732	0.00%	0.00%
Bertrand-Industrial	2,051,500	1,547,700	15,345,220	11,576,796	2.52%	1.83%
Bertrand-LMC	26,000	26,500	194,480	198,220	0.03%	0.03%
	81,559,600	82,804,900	610,065,808	619,380,652	100.00%	100.00%

NUMBER OF WATER AND SEWAGE ACTIVE ACCOUNTS

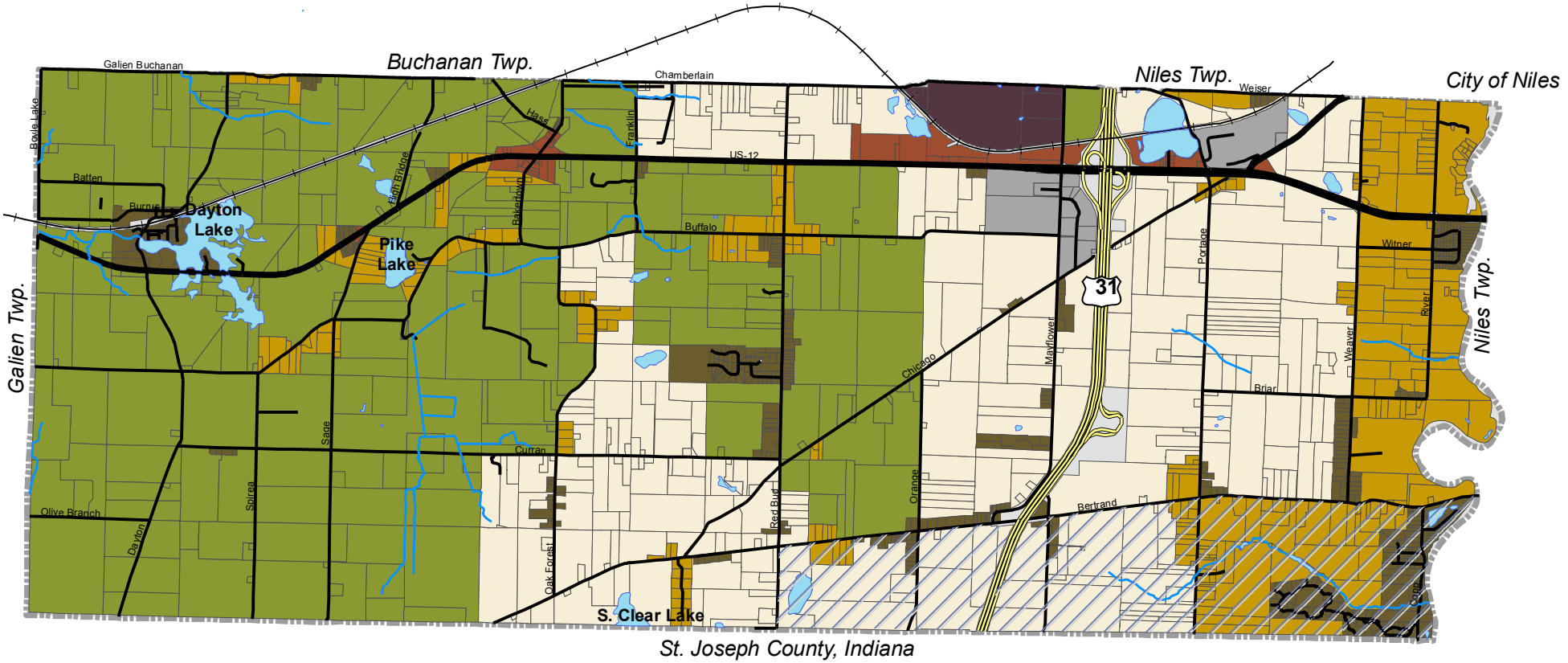
	2024	2023
City - Water with Sewage	4,677	4,234
City - Water Only	239	231
City - Sewage Only	5	5
Rural - Water with Sewage - Niles Township	11	10
Rural - Water with Sewage - Bertrand Township	18	15
Rural - Water Only - Niles Township	867	807
Rural - Water Only - Bertrand Township	3	3
Rural - Water Only - Howard Township	273	267
Rural - Water Only - Milton Township	4	4
Rural - Sewage Only - Niles Township	8	8
Rural - Sewage Only - Bertrand Township	1	1
Rural - Sewage Only - Howard Township	319	319
	6,425	5,904

Taps completed with meter settings 7

FIGURE 7

Zoning Map

Bertrand Township
Berrien County, MI



Zoning Designations

- MD Overlay District
- AG - Agricultural
- R-R - Rural Residential
- R-1 - Low Density Residential
- R-2 - Medium Density Residential
- PUD - Planned Unit Development
- C - Commercial
- IND - Industrial
- L - Landfill

ADOPTED: December 10, 2009

LSL Planning, Inc.

Data Sources:
Berrien County GIS
Michigan Center for Geographic Information

0 1,400 2,800 5,600 8,400 Feet

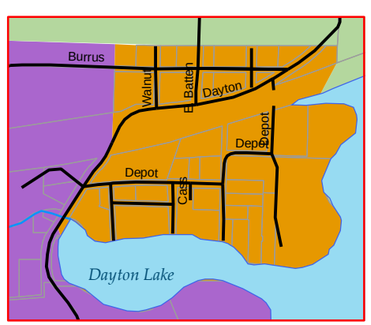
Map 7

Future Land Use

Bertrand Township
Berrien County, MI

Galien Buchanan
Buchanan Twp.
Chamberlain
Niles Twp.
Weiser
City of Niles
Boyle Lake
Batten
Burrus
Dayton Lake
Sebasty Lake
High Bridge
Hass
Franklin
US-12
Topinabee Lake
Bakertown
Buffalo
Pike Lake
31
Portage
Witner
River
Weaver
Niles Twp.
Maylflower
Chicago
Briar
Galien Twp.
Sage
Curran
Spirea
Olive Branch
Dayton
Red Bud
Orange
Bertrand
Oak Forest
South Clear Lake
Copp

St. Joseph County, Indiana



DAYTON AREA

Future Land Use Categories

- AP, Agriculture Preservation (3 ac. base density)
- RP, Rural Preservation (3 ac.)
- LDR, Low Density Residential (2 ac.)
- MDR, Medium Density Residential (1 ac.)
- MD, Mixed Use Development
- VC, Village Commercial
- C, Commercial
- IND, Industrial
- LF, Landfill

February 7, 2019

williams&works
engineers | surveyors | planners

Data Sources:
Berrien County GIS
Michigan Center for Geographic Information

0 0.25 0.5 1 Miles

FIGURE 8

fishbeck
Engineers | Architects | Scientists | Constructors

5913 Executive Drive, Suite 100
Lansing, Michigan 48911

517.882.0383 | fishbeck.com

Technical Memo

SUBJECT: 2023 Niles Flow Monitoring Analysis and Engineering Study

DATE: March 22, 2024 **PROJECT NO.:** 231682

Background

The City of Niles (City) received a request from Bertrand Township (Township) for the addition of sanitary flow at the Industrial Park for Bonnell Aluminum, the landfill, Caterpillar, and other potential future developments. The flow would enter the City's collection system upstream of the Bertrand Pump Station which transports the flow to the Western Electric Pump Station. The Western Electric Pump Station discharges to the gravity system at Philip Road upstream of the Grant Street Siphon at the Hospital. The existing capacity of the Bertrand Pump Station is 233 gallons per minute (gpm), and the existing capacity of the Western Electric Pump Station is 250 gpm.

The City collected flow data during the completion of the Stormwater, Asset Management, and Wastewater (SAW) grant and performed a Project Plan Certification (PPC) to see if the Grant Street Siphon could transport the flow from the EGLE design storm. The PPC showed significant improvement resulted from the projects completed between 2015 and 2017; however, the siphon was still under capacity. The purpose of this flow study was to look at the impact of the proposed developments to the siphon and any additional improvements that may be necessary to add the flow into the collection system from the Bertrand Pump Station through the Grant Street Siphon.

Analysis

As part of the PPC, the hydraulic model of the system was updated using collection system flow monitoring data completed in 2018 and 2019. On the west side, the farthest upstream the modeling had been completed was Site 3 on Parkway Street. Fishbeck took modeling results from 2019 and distributed the flow between the Bertrand Pump Station and the flow meter on Parkway Street using a weighted average based on house counts for each major junction between the two locations. The proposed flows were evaluated for the known future developments, along with an assigned flow for the proposed acreage based on *Ten State Standards*. The future development area in the industrial park can be seen in Figure 1. The City's collection system from the Bertrand Pump Station to the siphon can be seen in Figure 2.

Currently, Bertrand Township contributes approximately 205 gpm peak flow to the City's system based on the 2023 water use records for the Industrial Park. The future proposed flows for the landfill and Bonnell Aluminum were received from the Township. The City shared the Part 41 permit for Caterpillar for the anticipated flow rates. Flows for the additional undeveloped acreage was calculated based on *Ten State Standards*. The proposed peak flow will increase to approximately 388 gpm and is indicated in Table 1.

Table 1 – Future Peak Flow by Development

Development Source	Peak Flow (gpm)
Landfill	83
Bonnell Aluminum	120
Caterpillar	5
210 acres	180
Total	388

Based on the estimated flow splits, this would leave approximately 89 gpm of additional peak flow capacity in the Bertrand Pump Station once it has been upgraded for future flows. Future expansion at the Bertrand Pump Station was anticipated as the Industrial Park developed and accounted for in the original design. The pump station will need both pumps replaced to allow for the increase in flow. It is anticipated that new electrical will be needed also.

Table 2 – Future Peak Flow by Pump Station

Pump Station (PS)	Existing	Future
Bertrand PS	233	477
Western Electric PS	250	550

The Western Electric Pump Station will also need to be upgraded to handle the increased flows. The pump station will need new pumps and motor starters. The force main has had several failures in recent years and is at the end of its useful life. Changes in the head pressure from new pumps will cause a failure. A new force main will need to be sized to handle the increase in flows from Bertrand Township. It was determined that both the collection system between Bertrand Pump Station and Western Electric Pump Station and the collection system between Western Electric and the Grant Street Siphon have capacity; however, the known restriction at the Grant Street Siphon will need to be addressed.

Recommendations

Overall, the City's collection system has capacity for the future expansion of the Industrial Park with some select improvements. These improvements are at the Bertrand Pump Station, the Western Electric Pump Station, the Western Electric force main, and the Grant Street siphon.

To accept additional flows, both the Bertrand and Western Electric Pump Stations will need new pumps and controls. The costs for the pump station improvements are indicated in Table 3.

Table 3 – Pump Station Improvement Costs

Pump Station	Cost
Bertrand Pump Station	$200,000
Western Electric Pump Station	$400,000
Total	$600,000

It is recommended to replace the force main concurrently with the station improvements. This cost will be approximately $1.3 Million.

In addition to the pump stations, the Grant Street siphon needs to be replaced. The siphon has been a capacity restriction in the system for several years and has sanitary sewer overflows during extreme wet weather events. EGLE may not permit additional flows tributary to the collection system without addressing this restriction. There are two potential options for the siphon. The first option is a complete replacement of the siphon near the hospital. The second option is the addition of a fourth barrel to the siphon plus rehabilitation of the existing

siphon. The PPC report in 2019 did recommend a detention basin for storage in the hospital parking lot. However, with the increase in flows from the Industrial Park, that option is not considered viable.

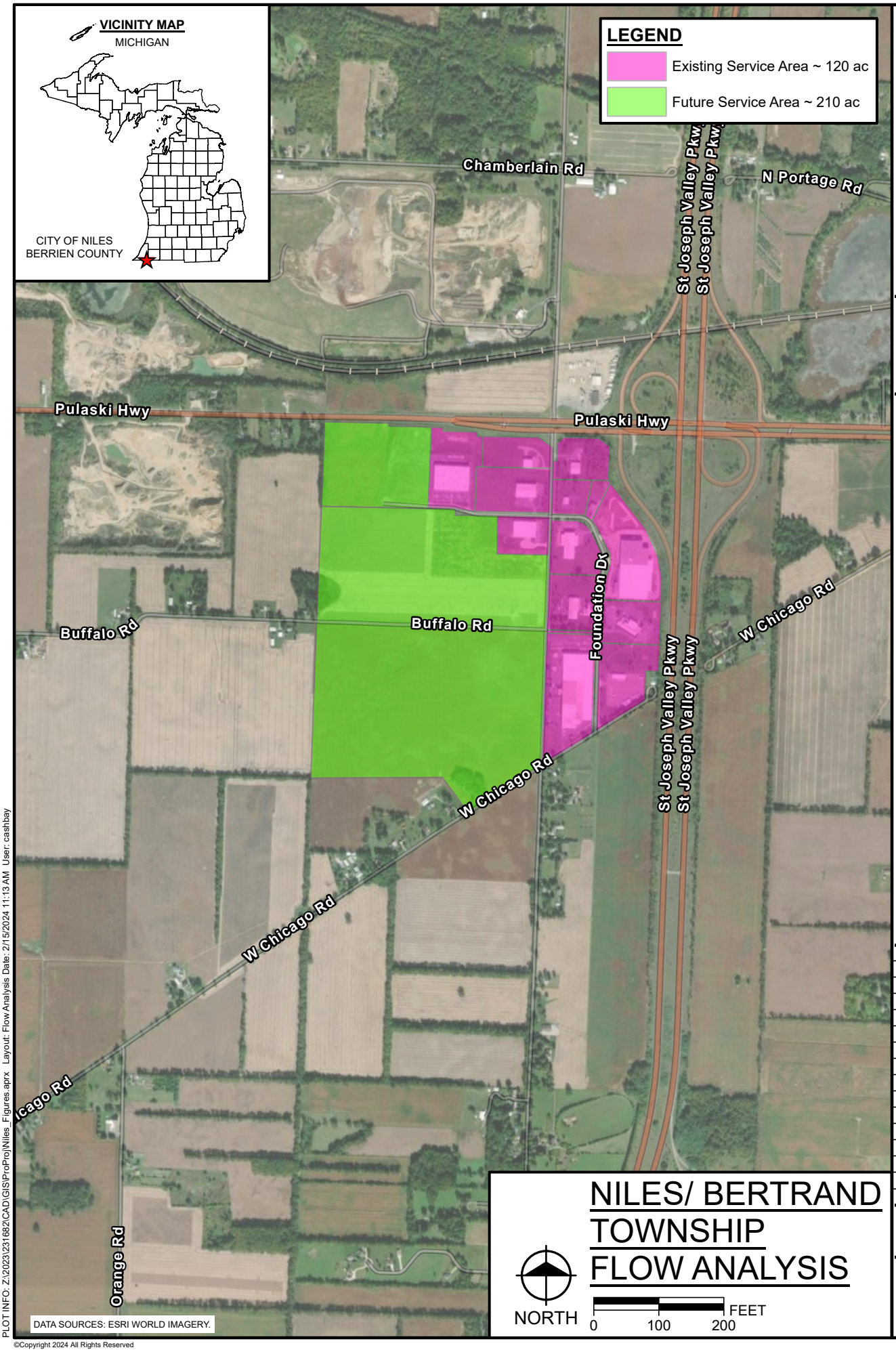
Table 4 – Grant Street Siphon Costs

Option	Cost
Option 1 – Siphon Replacement	$4,000,000
Option 2 – 4th Barrel	$2,000,000

The total cost for improvements necessary to accept the additional flow from the Industrial Park is approximately $4 Million.

Table 5 – Total Cost

Improvement Type	Cost
Pump Station	$600,000
Force Main	$1,300,000
Siphon	$2,000,000
Total	$3,900,000



NILES/ BERTRAND TOWNSHIP FLOW ANALYSIS

fishbeck
Engineers | Architects | Scientists | Constructors

Hard copy is intended to be 8.5"x11" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

City of Niles
Berrien County, Michigan

Flow Monitoring Analysis & Engineering Study

PROJECT NO.
231682

FIGURE NO.
1

PLOT INFO: Z:\2023\231682\CAD\GIS\ProProj\Niles_Figures.aprx Layout: Flow Analysis Date: 2/15/2024 11:13 AM User: cashbay

LEGEND

- Diversion Bypass
- Pump Station

Sewer Manholes

- Niles Township
- Bertand or City of Niles
- Private
- City of Niles

Sewer Gravity Mains

- Bertand or City of Niles
- Private
- City of Niles
- Sewer Pressurized Mains

St Joseph River
Niles Buchanan Rd
Niles Township
Grant St
Emergency Bypass
Niles
City of Niles
3rd St
Western Electric
Bertrand Crossing
Bertrand Township
Niles Township Community Park
#4
31
51
139
12

DATA SOURCES: ESRI LIGHT GRAY BASE & CITY OF NILES GIS.

PLOT INFO: Z:\2023\231682\CAD\GIS\ProProj\Niles_Figures.aprx Layout: Collection System Date: 3/4/2024 2:30 PM User: cashbay

NORTH

COLLECTION SYSTEM

0 750 1,500 FEET

fishbeck
Engineers | Architects | Scientists | Constructors

Hard copy is intended to be 11"x17" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

City of Niles
Berrien County, Michigan

Flow Monitoring Analysis & Engineering Study

PROJECT NO.
231682

FIGURE NO.
2

FIGURE 9

From: **Ric Huff** CityAdministrator@nilesmi.org
Subject: Re: Betrand Crossing
Date: January 9, 2019 at 3:23 PM
To: Jeff Smoke jsmoke@greatlakescapital.com, Barkley P. Garrett barkley@southwesternalliance.org, Ric Huff CityAdministrator@nilesmi.org, Jeff Dunlap UtilitiesManager@nilesmi.org

Good news. Thank you Jeff.

Richard A. Huff
City Administrator
City of Niles
Niles, Michigan 49120
269-683-4700 x-3011
Monday-Thursday 7:30a-5:30p
Friday 7:30a-11:30a

From: Jeff Smoke <jsmoke@greatlakescapital.com>
Date: Wednesday, January 9, 2019 at 10:23 AM
To: "Barkley P. Garrett" <barkley@southwesternalliance.org>, Ric Huff <cityadministrator@nilesmi.org>
Subject: FW: Betrand Crossing

I just spoke with Jeff Keiper and he says the water pressure is fine for multiple buildings.

Not sure why C&S barely passed the threshold?

Jeff Smoke + Director of Development
112 W. Jefferson Blvd., Suite 200, South Bend, IN 46601
Off: 574-855-5700 Cell: 574-360-5441
jsmoke@greatlakescapital.com | greatlakescapital.com

From: Jeffrey Keiper <jeffrey.keiper@femoran.com>
Sent: Thursday, January 3, 2019 11:31 AM
To: Jeff Smoke <jsmoke@greatlakescapital.com>
Subject: FW: Betrand Crossing

Jeff,
This indicates that the water flow would support a structure of 40’0” in building height or less. Should the client choose to exceed 40’0” in height a fire sprinkler system would need system modifications.
Those modifications would include either increasing the volume to the site from the supply, by increasing underground pipe sizes, or a standalone water system such as a water storage tank.

Hope this helps

From: Bill Parnell
Sent: Thursday, January 3, 2019 10:23 AM
To: Jeffrey Keiper <jeffrey.keiper@femoran.com>
Subject: Betrand Crossing

Jeff,
Gerry went to Niles Michigan this morning and met with the water company to perform a new flow test for that area.
Here is what he got at the intersection of Mayflower and Foundation Roads.

Static 50 PSI
Residual 40 PSI
Flowing 1165 GPM

Thanks
Bill

Bill Parnell
F.E. Moran, Inc. Fire Protection
Sales Representative
bill.parnell@femoran.com
www.femoran.com

847-714-8613 Direct
217-372-8678 Mobile

5208 Commerce Square Dr. Suite A
Indianapolis, IN 46237

FIGURE 10

PEERLESS MIDWEST INC

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

HORIZONTAL PUMP INSTALLATION REPORT

Sales Order No. 140360 Application Booster Date 11/12/2018

Pump Mfg. Peerless Serial No. 9917140265 Unit No. 1 (Closest to Well)

Owner Buchanan City Buchanan State MI

Location Rynearson Rd. Booster Station N 41.8206/W-086.3420

MOTOR Make Balder Type Horizontal Frame 256 JM Serial No. Z 1808150481

Hp 20 Volts 230/460 Line Voltage 240 Phase 3 RPM 1775 Model No. -

Was the motor and/or gear taken to a repair shop at this time? Motor New Where

Gear Where

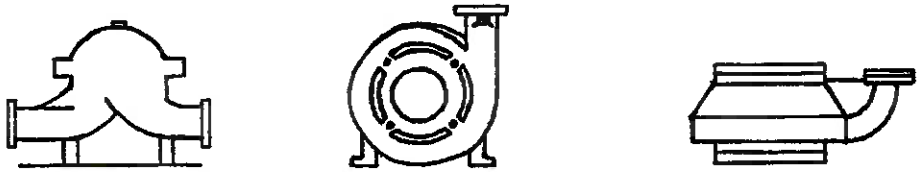
ENGINE Make None Model N/A Serial No. N/A

PUMP Type Close-Coupl. Figure No. N/A Model No. C1040A

Suction Size 5" Discharge Size 4" Rotation L.H. R.H. X

Rated 847 GPM at 65' TDH

Single Stage X Multiple Stage Impeller No. 9.59"



Split Case End Suction X Sewage Other

PUMPING TEST Pumped NDA GPM at NDA PSI NDA TDH

Suction Lift None ft. Suction Pressure 44 Lbs. After hours.

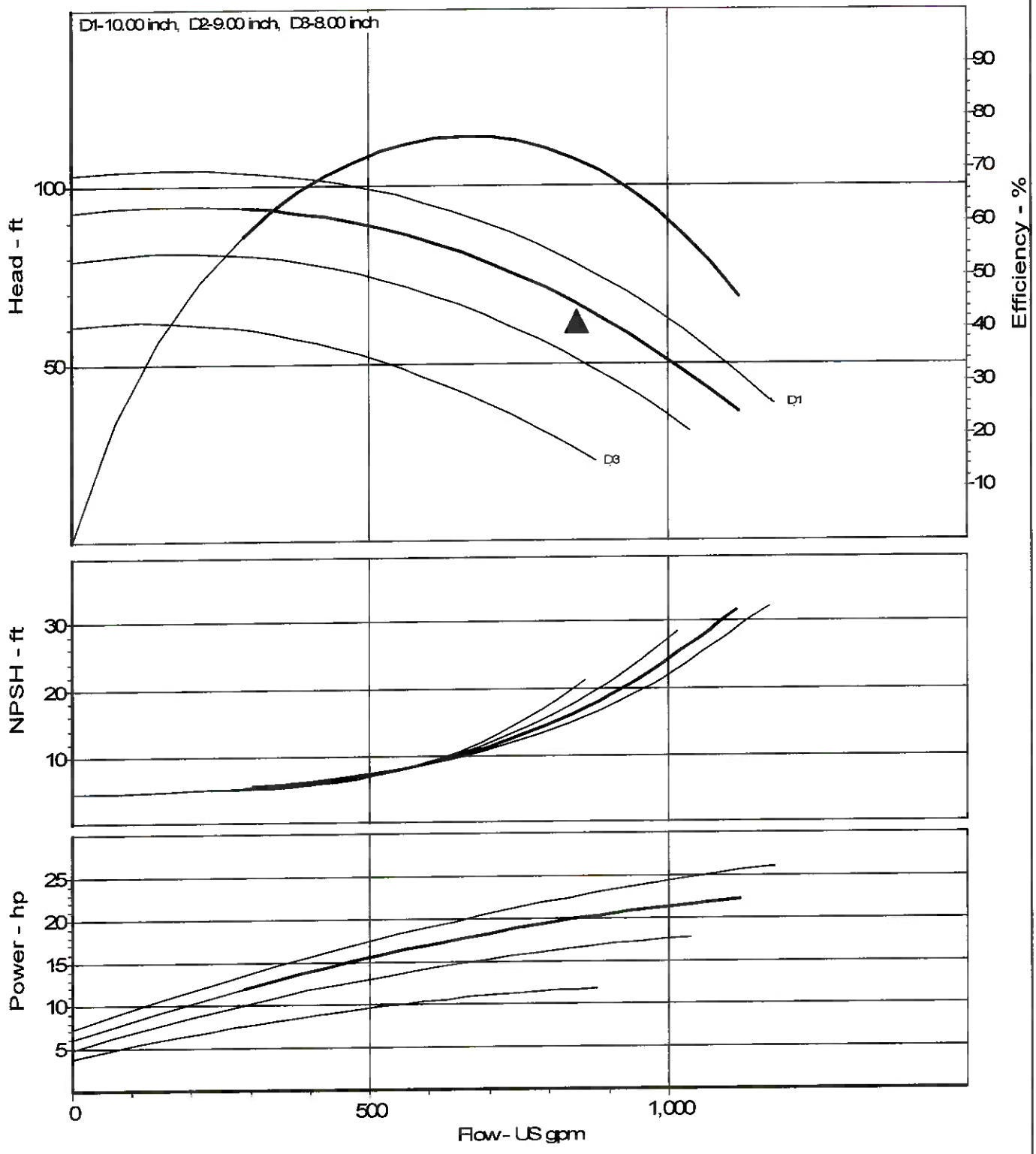
SPECIAL EQUIPMENT OR PULLING INSTRUCTIONS: Engine Hoist & Smeal

Remarks Pump has Mechanical Seal

Installer Rusty Jones

#1

Pump Model:	**Peerless - C1040A**	Nom. Speed:	**1750** RPM, 60 Hz Electric	Temperature:	**68** °F
Curve No.:	**3115020 /10-14**	Impeller Dia.:	**9.59** inch	Viscosity:	**1.007** cSt
Impeller No.		Fluid: **Water**		Sp. Gravity:	**1.000**
Tolerance :	**Hyd Ins 14.6 Unilateral**				



Comments:

Performance curve represents typical performance. See Hydraulic Performance document in RAPID for perfomance test acceptance grades/tolerances & contractual guarantees..

PEERLESS MIDWEST INC.

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

HORIZONTAL PUMP INSTALLATION REPORT

Sales Order No. 142978 Application Jockey Pump #3 Date 10/11/2018

Pump Mfg. Peerless Serial No. 685616 Unit No. Jockey Pump #3

Owner Buchanan Township City Buchanan State MI

Location 16584 Ryneason Rd @ the Booster Station

MOTOR Make WEG Type _____ Frame 184JM Serial No. UA50846 002360S3E

Hp 7.5 Volts 208 Line Voltage _____ Phase 3 RPM 3485 Model No. 184JM

Was the motor and/or gear taken to a repair shop at this time? Motor No Where _____

Gear - Where -

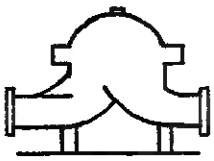
ENGINE Make None Model - Serial No. -

PUMP Type End Suction Figure No. _____ Model No. C-610A

Suction Size _____ Discharge Size _____ Rotation L.H. ____ R.H. ____

Rated 125 GPM at _____ TDH

Single Stage X Multiple Stage _____ Impeller No _____



Split Case _____ End Suction X Sewage _____ Other _____

PUMPING TEST Pumped _____ GPM at _____ PSI _____ TDH

Suction Lift _____ ft. Suction Pressure _____ Lbs. After _____ hours.

SPECIAL EQUIPMENT OR PULLING INSTRUCTIONS: _____

Remarks This was owners spare pump that was installed due to failure of Jockey Pump #3 / Serial #67168.

Serial #67168 was brought back to shop, overhauled and delivered back to site for spare pump.

Installer Ron Mead

PEERLESS PUMP

Sterling Fluid Systems (USA)

P O Box 7026, Indianapolis, Indiana, 46202

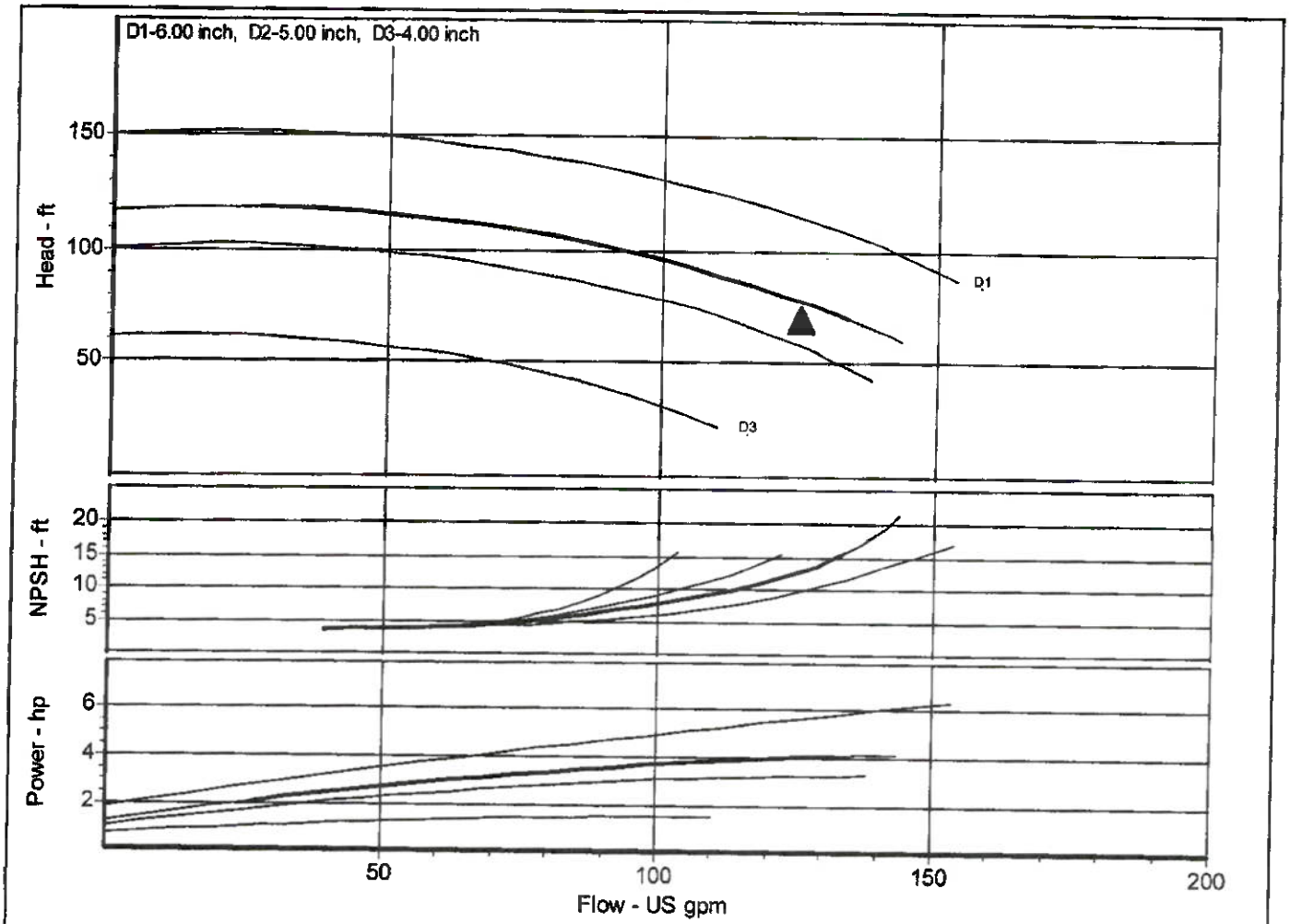
Customer : Abonmarche Group
95 West Main St.
Benton Harbor, MI
49023
USA

Jockey #3

Contact : Mr. Cory Candow
Phone : (269) 927-2295 Fax :
Date : Thursday, November 11, 2004

Project : Buchanan Twnshp Booster Project
Quote No. : US-7025-52 **Page No. :** 2

Pump Model:	Peerless - C610A	Nom. Speed:	3503 RPM, 60 Hz Electric	Duty Flow :	125 US gpm
Type:	C - End Suction Close Coupled General Purpose	Impeller Dia.:	5.36 inch	Duty Head :	75 ft
				Efficiency :	60.5 %
		Temperature:	68 °F	Power Required :	4.03 hp
		Viscosity:	1.009 cP	NPSH Required :	12.599 ft
Curve No.:	3115001	Sp. Gravity:	1.000	Peak Power:	4.11 hp
Impeller No.	2683848	Fluid:	Water	Closed Valve Pressure	117.023 ft
Item :	1				
Your Ref.:		Tolerance :	Hyd Inst-Peerless Std		



Comments:
Performance curve represents typical performance. See Standard Hydraulic Performance document in the selective printing area of RAPID for testing tolerances & contractual guarantees.

FIGURE 11

AURORA PUMP
MODEL 411 8X10X21A

PENTAIR

Customer : KERR PUMP & SUPPLY, INC. - (Aurora)

Project name : QTE241805

Pump Performance Datasheet

Encompass 3.0 - 25.2.1

Item Number / Tags	: 002	Size	: 411 - 8x10x21A
Service	:	Stages	: 1
Quantity	: 1	Based on curve number	: 14-8x10x21A-1175 Rev 7/19/13
Quote number	: QTE241805 - J&H	Date last saved	: 07 Aug 2025 8:55 AM

Operating Conditions

Flow, rated	: 1,500.0 USgpm
Head, rated (requested)	: 189.0 ft
Head, rated (actual)	: 189.5 ft
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available	: Ample
Site Supply Frequency	: 60 Hz

Performance

Speed criteria	: Synchronous
Speed	: 1175 rpm
Impeller dia.	: 20.50 in
Impeller diameter, maximum	: 21.00 in
Impeller diameter, minimum	: 16.00 in
Efficiency	: 77.44 %
NPSH required / margin required	: 6.31 / 0.00 ft
nq (imp. eye flow) / S (imp. eye flow)	: 23 / 231 Metric units
Minimum Continuous Stable Flow	: 470.8 USgpm
Head max.	: 201.7 ft
Head rise to shutoff	: 6.24 %
Flow, best eff. point	: 2,170.3 USgpm
Flow ratio, rated / BEP	: 69.12 %
Diameter ratio (rated / max)	: 97.62 %
Head ratio (rated dia / max dia)	: 95.65 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Acceptable

Liquid

Liquid type	: Water
Additional liquid description	:
Solids diameter, max	: 0.00 in
Solids size limit	: 1.13 in
Solids concentration, by volume	: 0.00 %
Temperature	: 68.00 deg F
Fluid density	: 1.000 / 1.000 SG
Viscosity	: 1.00 cP
Vapor pressure, rated	: 0.34 psi.a

Material

Material selected	: Standard

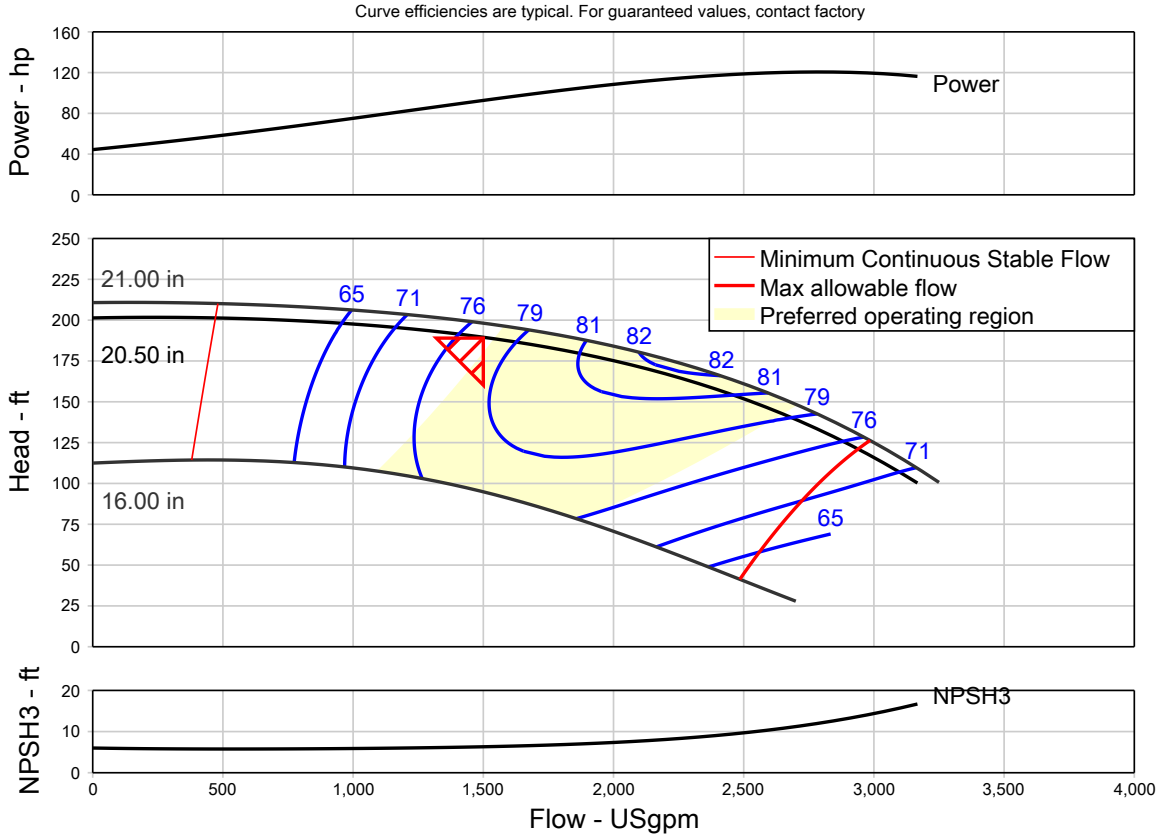
Pressure Data

Maximum working pressure	: 87.31 psi.g
Maximum allowable working pressure	: 250.0 psi.g
Maximum allowable suction pressure	: 250.0 psi.g
Hydrostatic test pressure	: 125.0 psi.g

Driver & Power Data (@Max density)

Driver sizing specification	: Max Power
Margin over specification	: 0.00 %
Service factor	: 1.00
Power, hydraulic	: 71.77 hp
Power, rated	: 92.69 hp
Power, maximum	: 121 hp
Motor rating	: 125 hp / 93.21 kW

Curve efficiencies are typical. For guaranteed values, contact factory



Item Number / Tags	002	Size / Stages	411 - 8x10x21A /
Quote number	QTE241805 - J&H	Pump speed	

Pump

Qty	Description
1	*Series 411 - 8x10x21A*

Pump information

Parameters

Impeller Diameter Selection Criteria: Impeller diameter calculated from 1500 USgpm and 189 Ft
Flow: 1500.0 US gpm
Head: 189.0 ft
Impeller diameter: 20.5000 inches - based on curve data
Speed: 1175 RPM
Suction Pressure (max): 0.00 psi
Pump model: Model 411 - Horizontal, single-stage, split case pump
Rotation: Right
Paint: Standard

Materials of Construction

Pump: 8x10x21A - Split case, Model 411, NSF 61/372 Certified
Casing: Cast iron, ASTM A48
Impeller: Low zinc Silicon Bronze, ASTM B584
Shaft: Alloy Steel
Case wear ring: Stainless Steel, AISI 416
Shaft sleeve: Stainless steel, AISI 316
Gland material: Cast Iron A48
Gland hardware: Gland hardware - standard
Sealing: Mechanical Seal, John Crane, Type 1; hot water, 225 °F max; Buna-N, Carbon, Ceramic, 18-8 SS

Pump Options

Base: None
Coupling: None
Bearing lubrication: None
Impeller wear ring: None
Drip pan (Available for Steel Base Only): None
Flush lines: 1/4" Stainless Steel (316) Tubing, from volute to stuffing boxes
Abrasive separator: None
Flange rating: 125 lb. suction, 125 lb. discharge
Internal Coating: 3M Skotchkote 134-fusion bonded impeller and casing
Petcock: None
Bypass orifice nipple: None

Engineering Options from Section 5000

Special Coating: None - STD
Elevated Skid: None

ABS Certification

ABS certification required?: No

Engineering Tests and Documentation

Is any additional testing required?: No

Motor

Qty	Description
1	**Pump information** **Driver** Motor: No Driver Selected **Pump Options** Motor frame: -Select One-

Hydronic Accessories

Qty	Description
1	**Hydronic Accessories** Select an Available Catalog: Hydronic Accessories

Weight

Qty	Description
1	**Shipping Skid Details** Skid weight: 40.79 lb (18.5 kg) **Weight** Approximate weight for quantity shown Pump weight: 1350 lb (612.35 kg) Y strainer: 0 lb (0 kg) Skid weight: 40.79 lb (18.5 kg) Total weight: 1390.79 lb (630.85 kg)

Skid

Qty	Description
1	**Shipping Skid Details** Pump Skid Pallet 47" W x 46" L, Floor area per skid 15.01 sq.ft (1.39 sq.m) Shipping comments Pentair does not recommend stacking skids. Please use the estimated dimensions to calculate shipping container requirements, as floor load only. Total floor area 15.01 sq.ft (1.39 sq.m)

VFD

Qty	Description
1	**VFD** VFD required: No

No Group

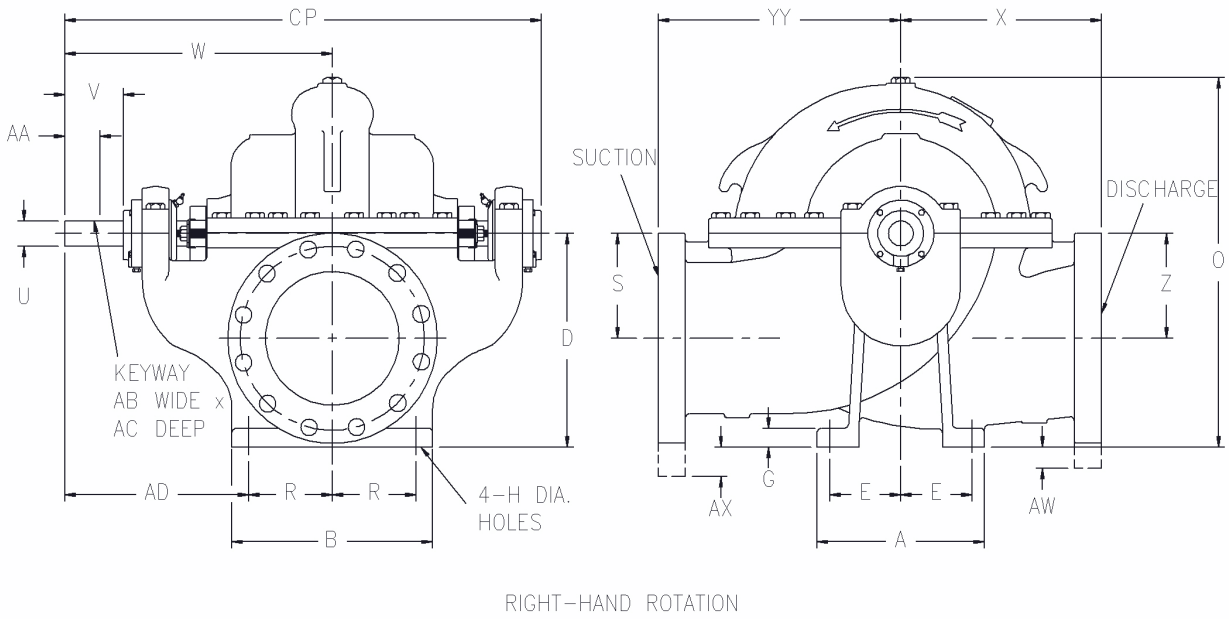
Qty	Description
1	Quick Ship: Not Available Quick Ship: Not Available Sealing Kits: None Overhaul Kits: None Rotating Assembly Kits: None

The Equipment referenced in the attached quote or proposal is specifically designed and dimensioned for, and intended only to be installed in Large Scale Fixed Installations (LSFI) as that term is defined in RoHS (EU Directive 2011/65) as such Directive may be amended from time to time.

The Buyer by placing its order warrants and represents, and shall ensure that any customer of the Buyer to whom the Buyer resells or otherwise assigns the Equipment warrants and represents, that (i) the Equipment will be solely and exclusively installed in combination with other equipment, sub-systems, apparatus and/or devices which are intended to be a part of a “large scale” installation (*Examples of “large scale” installations may include but are not limited to installations which (a) are too large to be moved in an ISO 20 foot container because the total sum of its parts as transported is larger than 5,71m x 2,35m x 2,39m; (b) are too heavy to be moved by a 44 tonne road truck; (c) have a rated power greater than 375 kW; and/or (d) require cranes to be completely installed); (ii) the installation in which the Equipment will be utilized will be assembled, installed, and de-installed by professionals holding the requisite knowledge, experience, and licenses necessary to undertake and complete the work related to the installation; and (iii) the overall system in which the Equipment will be included will be used permanently in a pre-defined and dedicated location.

The Buyer further acknowledges and agrees that Pentair is relying on the above warranties and representations by Buyer as a material inducement to sell the Equipment to Buyer, and Buyer will defend, indemnify, and hold Pentair harmless from and against any and all claims, losses, fines, decrees, penalties, and/or causes of action arising out of or related to breach of the above warranties and representations, including but not limited to those brought by any governmental or quasi-governmental authority.

General Arrangement Drawing



RIGHT-HAND ROTATION

A	B	D	E	G	H	O	R	S	U	V	W	X	Z	AA	AB	AC	AD	AW	AX	CP	YY
20.00	17.00	18.50	9.00	1.00	0.88	32.50	7.50	9.50	2.13	5.44	21.87	18.00	9.50	4.75	0.50	0.25	14.38	N/A	N/A	38.00	21.00

Notes:

All dimensions are in inches.

Dimensions may vary ± 1/2" (13mm) due to normal manufacturing tolerances.

Discharge and suction flanges - ANSI Standard flat face.

Pump Data			
Pump series	410	Power series	6B
Model	411	Discharge size	8.00 in
Size	8x10x21A	Suction size	10.00 in
Flow	1,500.0 USgpm	Impeller diameter	20.50 in
Head	189.0 ft	Pressure rating	250.0 psi
RPM	1175 rpm	Temperature rating	68.00 deg F
Rotation	Right	Connection suc/disc	125#/125#
Paint	Standard	Coupling type	-
Liquid type	Water		

Pump Materials of Construction			
Pump material	Bronze fitted	Shaft	Alloy Steel
Casing	Cast iron, ASTM A48	Shaft sleeve	Stainless steel, AISI 316
Casing wear ring	Stainless Steel, AISI 416	Gland	-
Impeller	Low zinc Silicon Bronze, ASTM B584	Seal type	Mechanical
Impeller wear ring	None	Sealing material	-
Flush lines	1/4" Stainless Steel (316)	Tubing, from volute to stuffing boxes	

Estimated Weights	
Pump	1,390.8 lb
Total	1,390.8 lb

Additional Options

Scotchkote bonded casing

-

-

-

-

-

-

-

Quote Information	
Customer	KERR PUMP & SUPPLY, INC. - (Aurora)
Customer quote	2618514
Job name	QTE241805
Market	Industrial

PENTAIR	Quote item	002
	Quote date	07 Aug 2025

DATA SHEET

Three Phase Induction Motor - Squirrel Cage

Customer :

Product line	: W22 NEMA Premium Efficiency Three-Phase	Product code :	13273087
		Catalog # :	12512ET3E445T-W22G

Frame	: 444/5T	Locked rotor time	: 34s (cold) 19s (hot)
Output	: 125 HP	Temperature rise	: 80 K
Poles	: 6	Duty cycle	: Cont.(S1)
Frequency	: 60 Hz	Ambient temperature	: -20°C to +40°C
Rated voltage	: 230/460 V	Altitude	: 1000 m.a.s.l.
Rated current	: 290/145 A	Protection degree	: IP55
L. R. Amperes	: 1856/928 A	Cooling method	: IC411 - TEFC
LRC	: 6.4x(Code G)	Mounting	: F-1
No load current	: 120/60.0 A	Rotation[1]	: Both (CW and CCW)
Rated speed	: 1189 rpm	Noise level[2]	: 69.0 dB(A)
Slip	: 0.92 %	Starting method	: Direct On Line
Rated torque	: 552 ft.lb	Approx. weight[3]	: 1801 lb
Locked rotor torque	: 210 %		
Breakdown torque	: 240 %		
Insulation class	: F		
Service factor	: 1.15		
Moment of inertia (J)	: 104 sq.ft.lb		
Design	: B		

Output	25%	50%	75%	100%
Efficiency (%)	95.3	95.0	95.4	95.0
Power Factor	0.43	0.69	0.78	0.82

Foundation loads

Max. traction	: 3000 lb
Max. compression	: 4801 lb

Losses at normative operating points (speed;torque), in percentage of rated output power

P1 (0,9;1,0)	P2 (0,5;1,0)	P3 (0,25;1,0)	P4 (0,9;0,5)	P5 (0,5;0,5)	P6 (0,5;0,25)	P7 (0,25;0,25)
5.2	4.1	3.7	2.7	1.7	1.2	0.8

		Drive end	Non drive end
Bearing type	:	6319 C3	6316 C3
Sealing	:	WSeal	WSeal
Lubrication interval	:	13000 h	16000 h
Lubricant amount	:	45 g	34 g
Lubricant type	:	Mobil Polyrex EM	

Notes
USABLE @208V 316A SF 1.00 SFA 316A

This revision replaces and cancel the previous one, which must be eliminated.
(1) Looking the motor from the shaft end.
(2) Measured at 1m and with tolerance of +3dB(A).
(3) Approximate weight subject to changes after manufacturing process.
(4) At 100% of full load.

These are average values based on tests with sinusoidal power supply, subject to the tolerances stipulated in NEMA MG-1.

Rev.	Changes Summary	Performed	Checked	Date

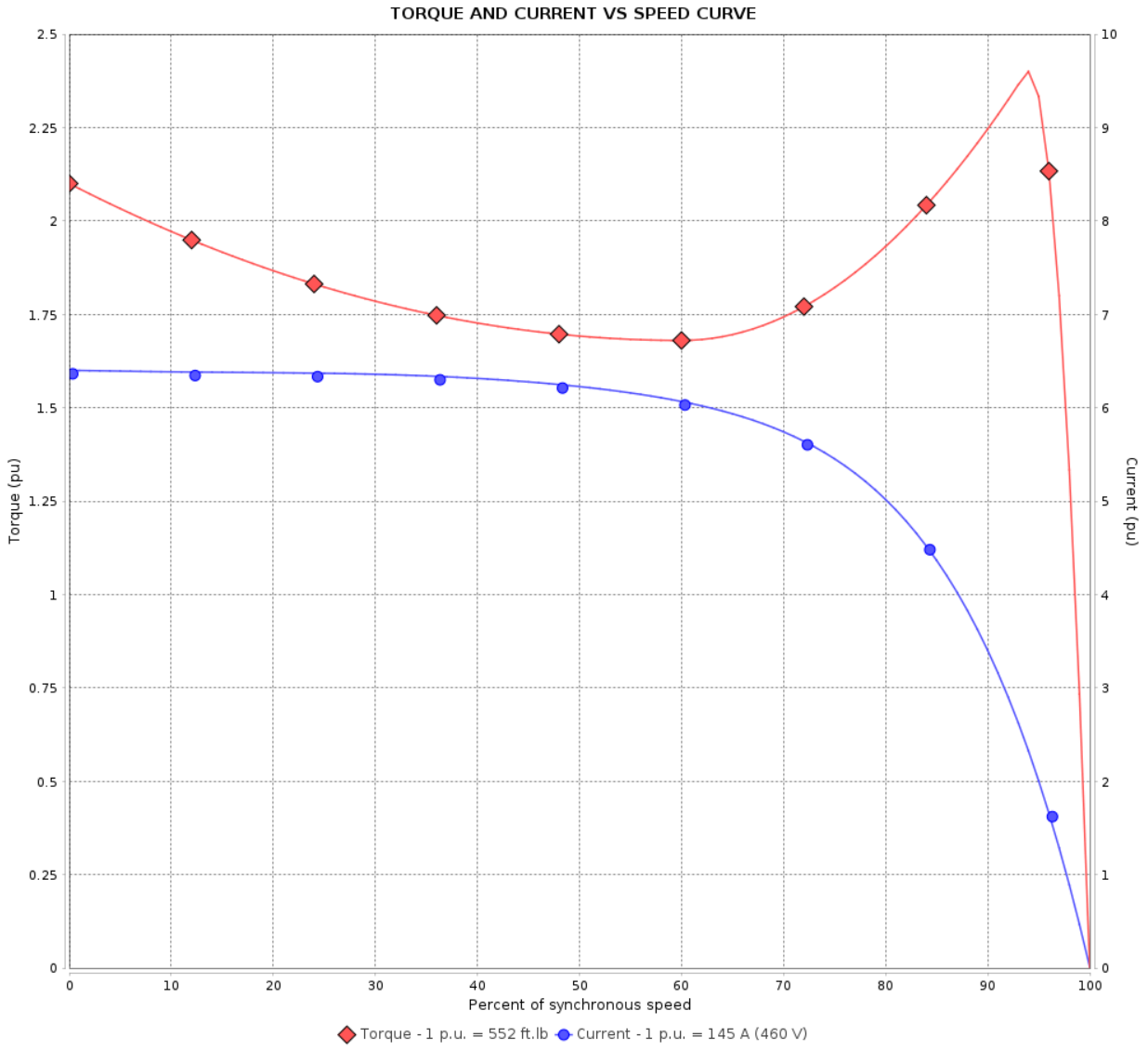
Performed by				
Checked by			Page	Revision
Date	07/08/2025		1 / 6	

TORQUE AND CURRENT VS SPEED CURVE

Three Phase Induction Motor - Squirrel Cage

Customer :

Product line	: W22 NEMA Premium Efficiency Three-Phase	Product code :	13273087
		Catalog # :	12512ET3E445T-W22G



Performance	: 230/460 V 60 Hz 6P		
Rated current	: 290/145 A	Moment of inertia (J)	: 104 sq.ft.lb
LRC	: 6.4	Duty cycle	: Cont.(S1)
Rated torque	: 552 ft.lb	Insulation class	: F
Locked rotor torque	: 210 %	Service factor	: 1.15
Breakdown torque	: 240 %	Temperature rise	: 80 K
Rated speed	: 1189 rpm	Design	: B
Locked rotor time	: 34s (cold) 19s (hot)		

Rev.	Changes Summary	Performed	Checked	Date

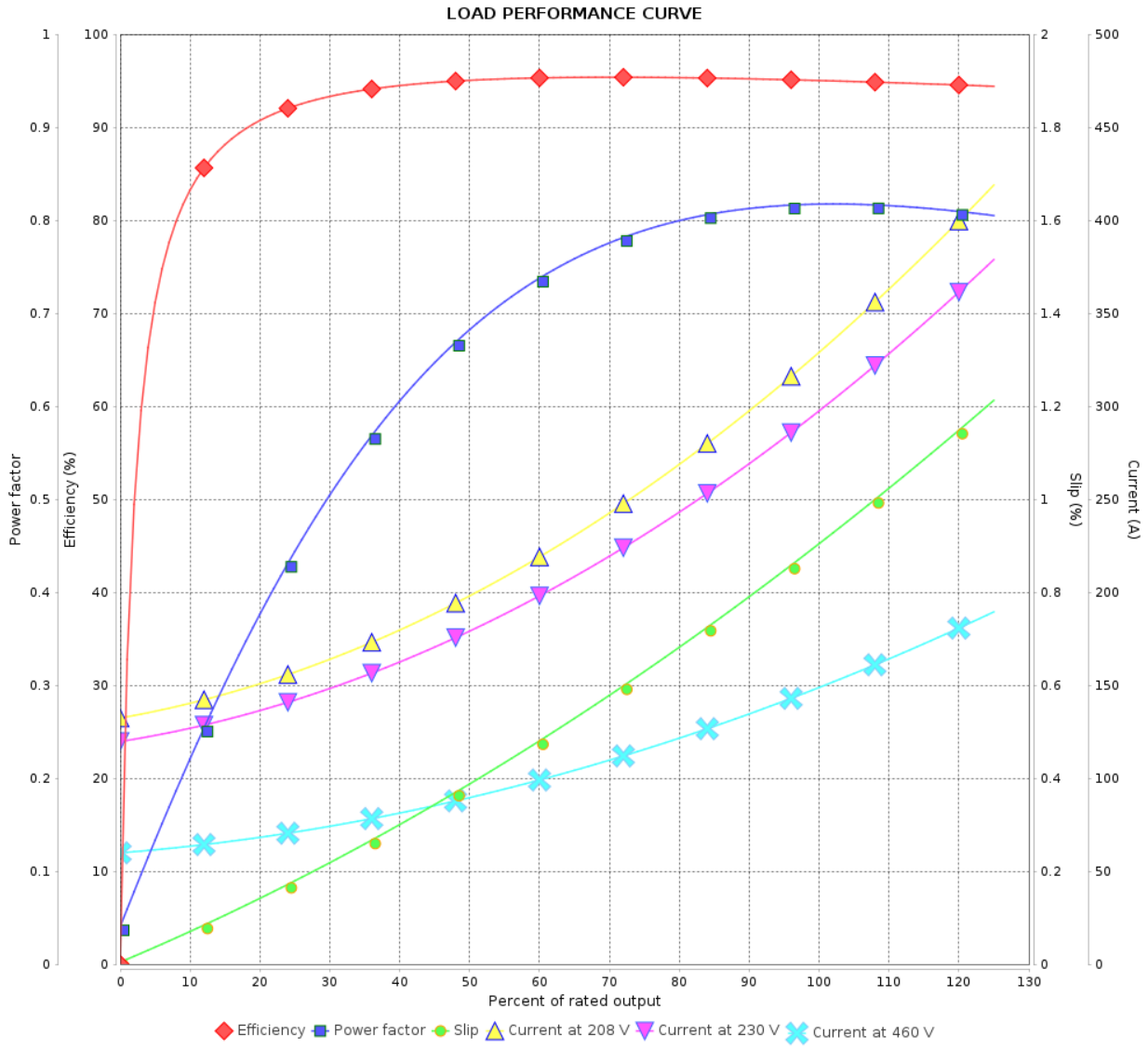
Performed by				
Checked by			Page	Revision
Date	07/08/2025		2 / 6	

LOAD PERFORMANCE CURVE

Three Phase Induction Motor - Squirrel Cage

Customer :

Product line	: W22 NEMA Premium Efficiency Three-Phase	Product code :	13273087
		Catalog # :	12512ET3E445T-W22G



Performance	: 230/460 V 60 Hz 6P		
Rated current	: 290/145 A	Moment of inertia (J)	: 104 sq.ft.lb
LRC	: 6.4	Duty cycle	: Cont.(S1)
Rated torque	: 552 ft.lb	Insulation class	: F
Locked rotor torque	: 210 %	Service factor	: 1.15
Breakdown torque	: 240 %	Temperature rise	: 80 K
Rated speed	: 1189 rpm	Design	: B

Rev.	Changes Summary	Performed	Checked	Date

Performed by				
Checked by			Page	Revision
Date	07/08/2025		3 / 6	

THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage

Customer :

Product line	: W22 NEMA Premium Efficiency Three-Phase	Product code :	13273087
		Catalog # :	12512ET3E445T-W22G

Performance	: 230/460 V 60 Hz 6P

Rated current	: 290/145 A	Moment of inertia (J)	: 104 sq.ft.lb
LRC	: 6.4	Duty cycle	: Cont.(S1)
Rated torque	: 552 ft.lb	Insulation class	: F
Locked rotor torque	: 210 %	Service factor	: 1.15
Breakdown torque	: 240 %	Temperature rise	: 80 K
Rated speed	: 1189 rpm	Design	: B

Heating constant	
Cooling constant	

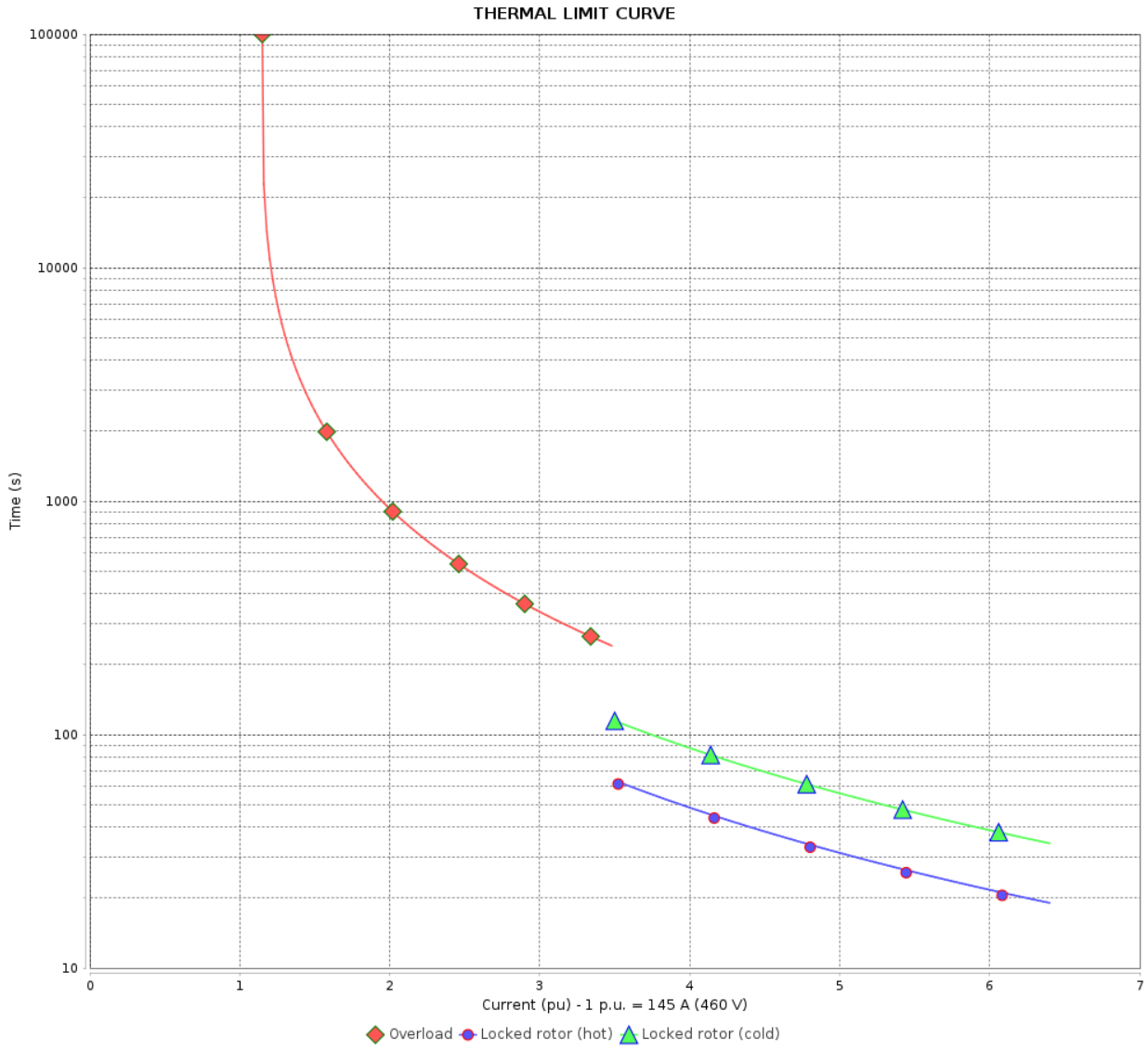
Rev.	Changes Summary	Performed	Checked	Date

Performed by				
Checked by			Page	Revision
Date	07/08/2025		4 / 6	

THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage

Customer :



Rev.	Changes Summary	Performed	Checked	Date

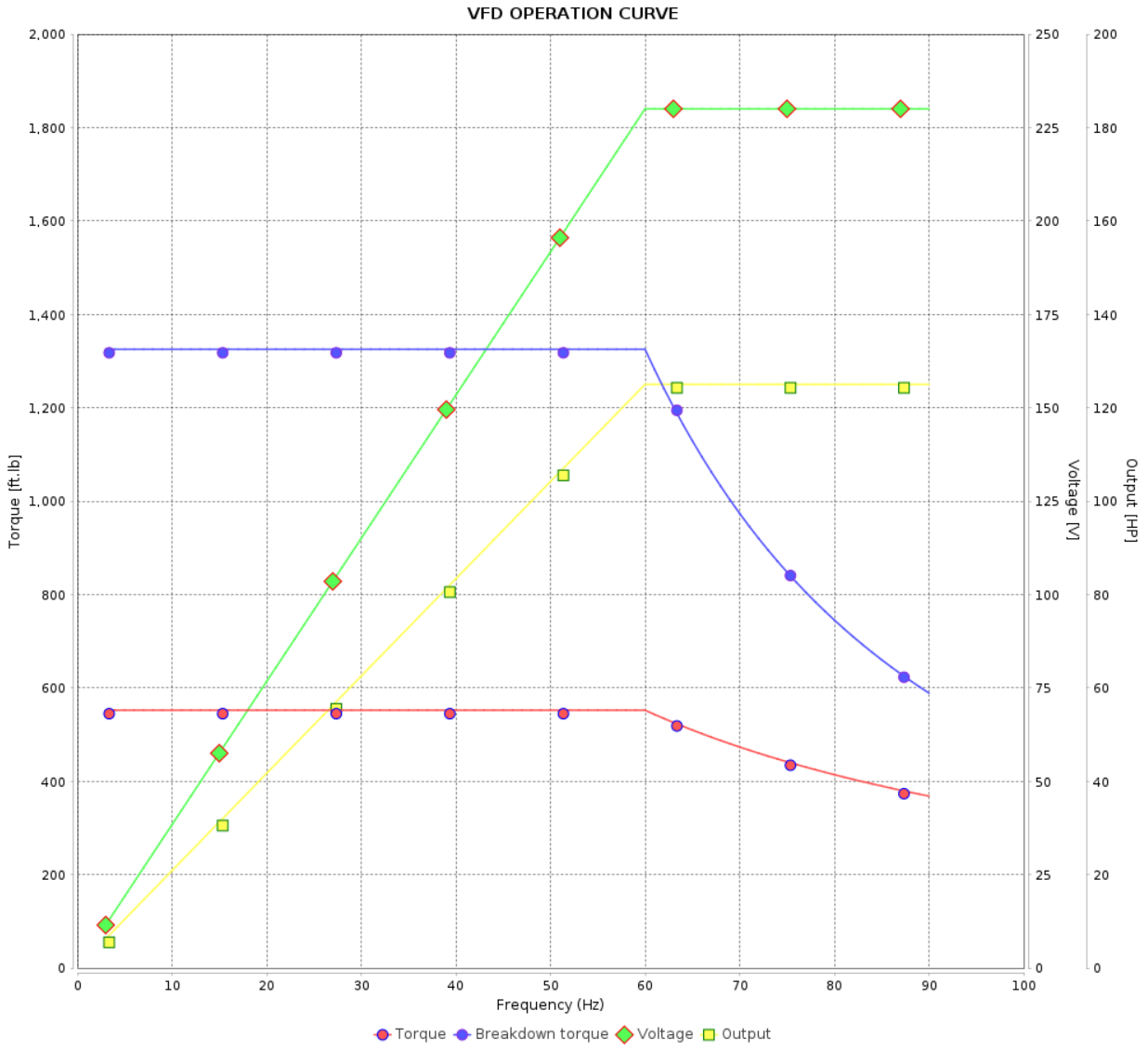
Performed by				
Checked by			Page	Revision
Date	07/08/2025		5 / 6	

VFD OPERATION CURVE

Three Phase Induction Motor - Squirrel Cage

Customer	:

Product line	: W22 NEMA Premium Efficiency Three-Phase	Product code :	13273087
		Catalog # :	12512ET3E445T-W22G

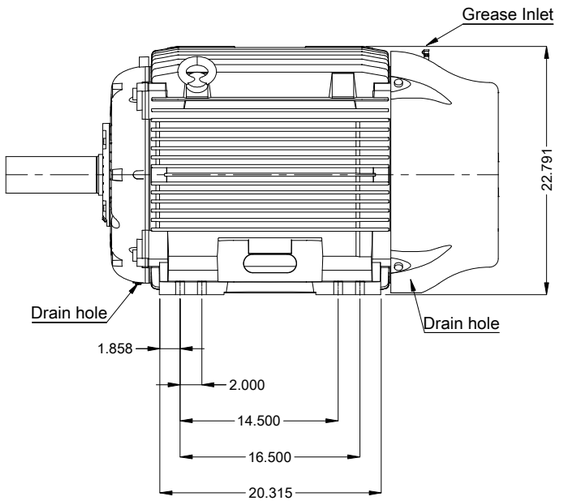


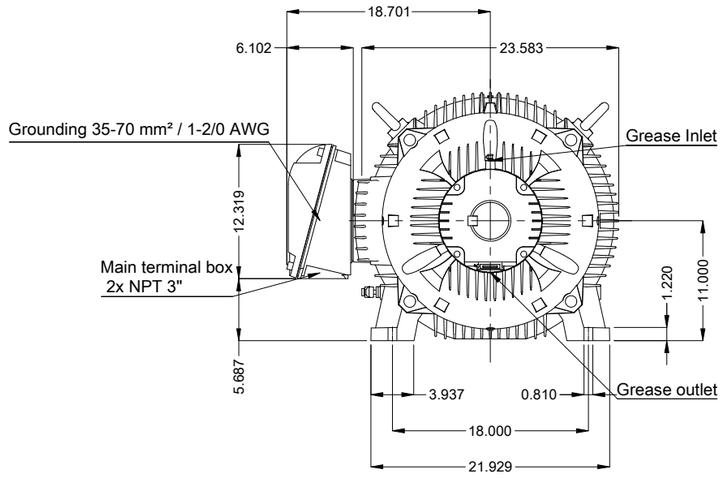
Performance	: 230/460 V 60 Hz 6P

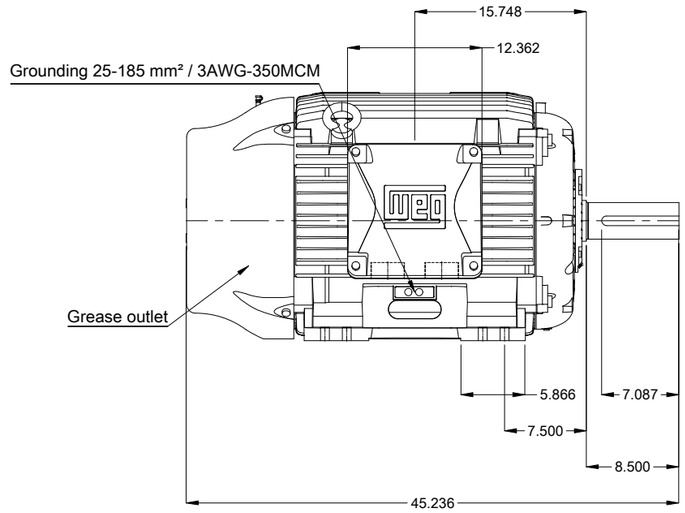
Rated current	: 290/145 A	Moment of inertia (J)	: 104 sq.ft.lb
LRC	: 6.4	Duty cycle	: Cont.(S1)
Rated torque	: 552 ft.lb	Insulation class	: F
Locked rotor torque	: 210 %	Service factor	: 1.15
Breakdown torque	: 240 %	Temperature rise	: 80 K
Rated speed	: 1189 rpm	Design	: B

Rev.	Changes Summary	Performed	Checked	Date

Performed by				
Checked by			Page	Revision
Date	07/08/2025		6 / 6	

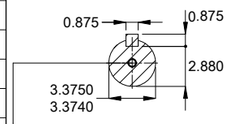






Without vertical jackscrews
Internal AEGIS ground ring on the DE
Color RAL 5009
Painting plan 203A
Mounting NEMA F-1
Mounting B3R(D)

DE Shaft End



DUNC 3/4"-10 WEG WPR-7339

125 HP 06 Poles 60 Hz | A

Scale 1 : 14

ECM	LOC	SUMMARY OF MODIFICATIONS	EXECUTED	CHECKED	RELEASED	DATE	VER
			HYBRISUSER				00

EXECUTED	HYBRISUSER
CHECKED	
RELEASED	
REL. DATE	

THREE PH. MOTOR W22 NEMA PREM. EFF.
FRAME 444/5T IP55 TEFC

PREVIEW

WDD 00

SHEET 1 / 1

Dimensions in inches

A3

NEMA Premium W22

60Hz: For use on PWM: VT 1000:1, CT 20:1, 1.00SF

3PT9 LISTED C US

Mod.TE1BF0XON CC029A C US Energy Verified

MODEL 12512ET3E445T-W22G

Inverter Duty Motor
Severe Duty

MADE IN BRAZIL
13273087

PH3 60Hz Fr. 444/5T 1000m.a.s.l. IP55 TEFC 1802lb

V 230/460 A 286/143

HP 125 kW 90

SF 1.15 SFA 329/164

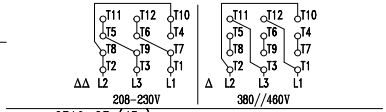
RPM 1185 PF 0.83

AMB 40°C INS cl. F DT80K NEMA NOM EFF 95.0%

DUTY CONT. DES B Code G

USABLE @208V 316A SF 1.00

125HP 90kW 50Hz 380V 172A 980RPM SF 1.00 EFF 93.6% (IE1)



→ 6319-C3 (45g)

→ 6316-C3 (34g)

MOBIL POLYREX EM (13000h)

FIGURE 12

Technical Information

OC4X4-200/4,3T/C

Operating data

Flow	235 US g.p.m.
Head	40.5 ft
Shaft power P2	3.73 hp
Pump efficiency	62.6 %
Required pump NPSH	
Pump type	Single pump
No. of pumps	1
Fluid	Water

Pump

Pump Code	OC4X4-200/4,3T/C
Impeller	Vane impeller with cutter sys.
Impeller size	$7^{7}/_{8}$"
Solid size	
Discharge port	4" ANSI
Suction port	DN100

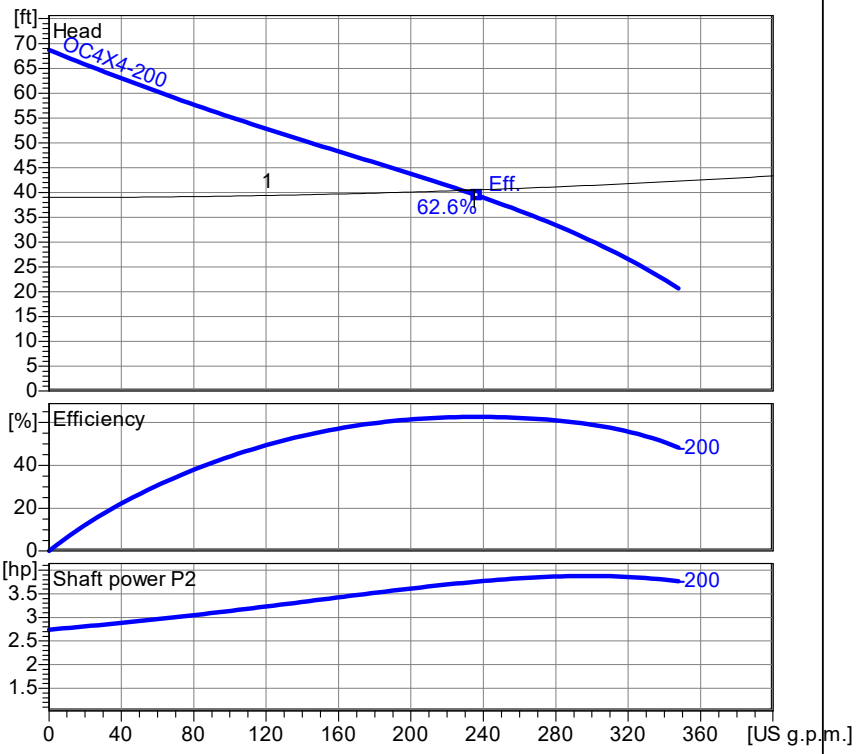
Motor

Rated voltage	230/ 460 V
Frequency	60 Hz
Rated power P2	4.3 hp
Rated speed	1750 rpm
Number of poles	4
Efficiency	85 %
Rated current	11 / 5,5 A
Degree of protection	IP 68

Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Impeller	Hard cast iron ASTM A532 IIIA, 60HRC
Wear plate with cutter	Hard cast iron ASTM A532 IIIA, 60HRC
Suction cover	Cast Iron ASTM A48;Cl.40B
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel
Elastomers	Nitrile Rubber
Mechanical seal on motor side	SiC / SiC
Mechanical seal on medium side	SiC / SiC
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: **HI Standard Sect. 11.6.5.4**



Wet well installation with coupling kit (T, 150...200)
Dimensions in mm [inch], letters see table

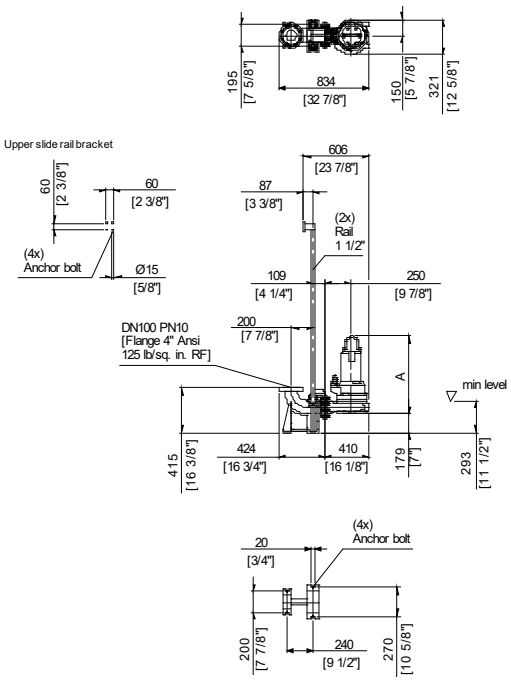


Table Dimensions (inch)

A	$25^{1}/_{4}$

Project	Project no.:	Created by:	Page:	Date:
			1	2025-08-21

Performance Curve

OC4X4-200/4,3T/C

HOMA PUMPEN MIT SYSTEM

Impeller

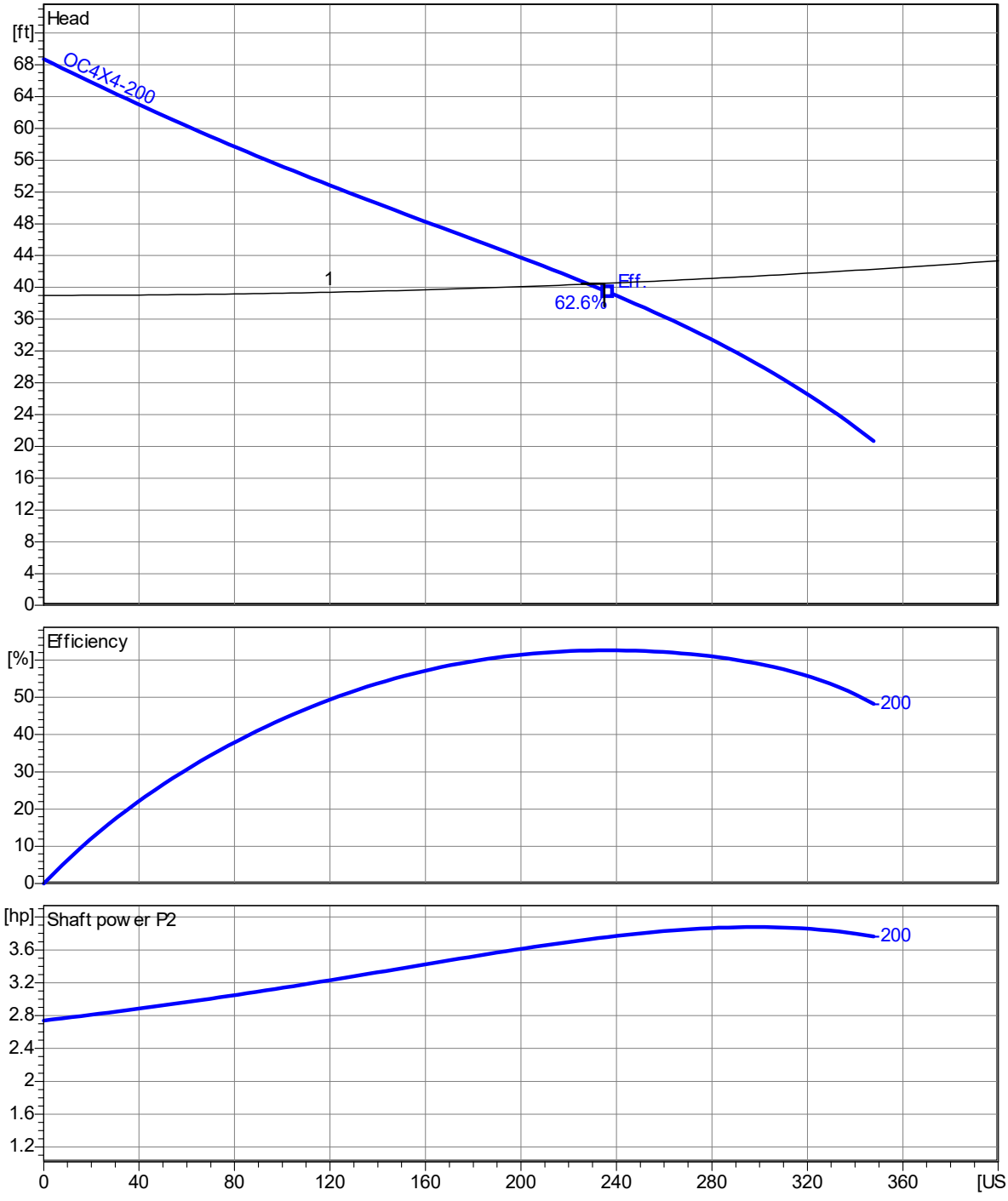
Impeller type:	Solid size Ø:	Max. Ø:	Min. Ø:	Sel. Ø:	
Vane impeller with cutter sys.		7 7/8"	5 7/8"	7 7/8"	

Operating data

Speed:	Frequency:	Duty point:	Shaft power P2:	Discharge port:
1750 rpm	**60 Hz**	**Q =235 US g.p.m. H =40.5 ft**	**3.73 hp**	**4" ANSI**

Power data referred to:
Water, clean [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **HI Standard Sect. 11.6.5.4**



Project	Project no.:	Created by:	Page:	Date:
			2	**2025-08-21**

Dimensions

OC4X4-200/4,3T/C

Wet well installation with coupling kit (T, 150...200)
Dimensions in mm [inch], letters see table

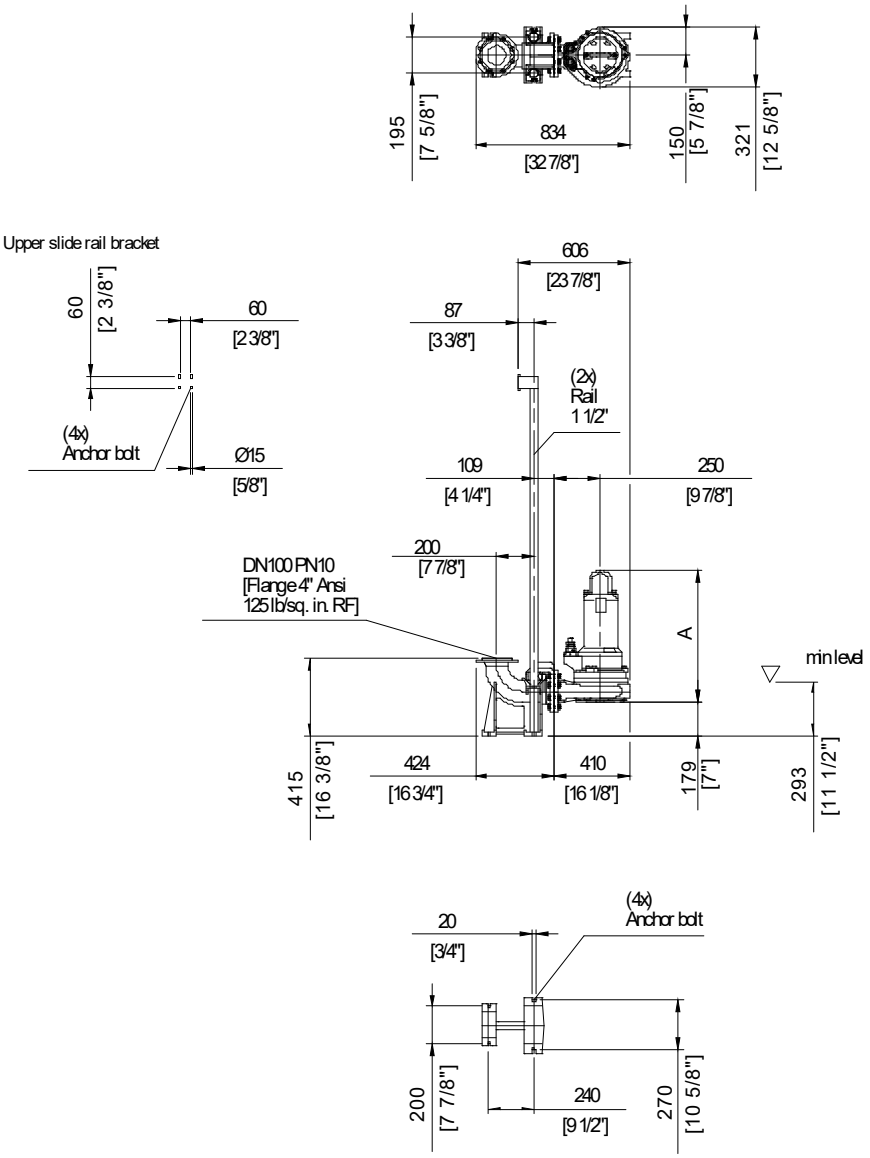


Table Dimensions (inch)

A	25 1/4

min level = Minimum fluid level for intermittent operation (S3)

Project	Project no.:	Created by:	Page:	Date:
			3	2025-08-21

Technical Data

OC4X4-200/4,3T/C

Operating data					
Flow	**235 US g.p.m.**		**Head**	**40.5 ft**	**ft**
Shaft power P2	**3.7**	**hp**	**Static head**	**39**	**ft**
Pump efficiency	**62.6**	**%**	**Required pump NPSH**		**ft**
Pump type	Single pump		No. of pumps	1	
Fluid	Water		Temperature	68	°F
Density	62.31	lb/ft³	Kin. viscosity	1.077E-5	ft²/s

Pump					
Pump Code	OC4X4-200/4,3T/C		Speed	1750	rpm
Suction port	DN100		Head Max.	68.7	ft
Discharge port	4" ANSI		Head Min.	20.7	ft
Impeller type	Vane impeller with cutter sys.		Flow Max.	347.8	US g.p.m.
Solid size		inch	Pump efficiency max.	62.6	%
Impeller Ø	7.87	inch	Required rated power max. P2	3.9	hp

Motor					
Motor design	Submersible motor		Insulation class	H	
Motor name	AM173.5T/4/3		Degree of protection	IP 68	
Frequency	60	Hz	Temperature class	T3C	
Rated power P2	4.3	hp	NEMA code	F	
			Explosion protection		
Rated speed	1750	rpm	Efficiency at % rated power 100%	85.0	%
Rated voltage	230 / 460 V	3~	Efficiency at % rated power 75%	87.0	%
Rated current	11.0 / 5,5	A	Efficiency at % rated power 50%	86.0	%
Starting current, direct starting	56.0 / 28	A	cos phi at % rated power 100%	0.86	
Starting current, star-delta		A	cos phi at % rated power 75%	0.80	
Starting mode	Directly		cos phi at % rated power 50%	0.71	
Power cable	14AWG-4+14AWG-4		Control cable		
Type of power cable	RHW-2		Type of control cable		
Cable length	32.8 ft		Service factor	1.15	
Shaft seal	Mechanical seal on motor side		SiC / SiC		
	Mechanical seal on medium side		SiC / SiC		
Bearing	Lower Bearing		Double row angular ball bearing		
	Upper Bearing		Deep Groove Ball Bearing		
Remarks					

Materials / Weight			
Motor housing	Cast Iron ASTM A48;Cl.40B	Motor shaft	AISI 430 F Stainless Steel
Pump housing	Cast Iron ASTM A48;Cl.40B	Bolts	AISI 304 Stainless Steel
Impeller	Hard cast iron ASTM A532 IIIA, 60HRC	Elastomers	Nitrile Rubber
Wear plate with cutter	Hard cast iron ASTM A532 IIIA, 60HRC		
Suction cover	Cast Iron ASTM A48;Cl.40B		
Weight aggregate	253.53 lb		

Project	Project no.:	Created by:	Page: 4	Date: 2025-08-21

FIGURE 13

Technical Information

AMS434-200/7,5T/C

Operating data

Flow	275 US g.p.m.
Head	41.5 ft
Shaft power P2	5.21 hp
Pump efficiency	67.3 %
Required pump NPSH	6.3 ft
Pump type	Single pump
No. of pumps	1
Fluid	Water

Pump

Pump Code	AMS434-200/7,5T/C
Impeller	Single channel impeller
Impeller size	$7^{7}/_{8}$"
Solid size	3 inch
Discharge port	4" ANSI
Suction port	DN100

Motor

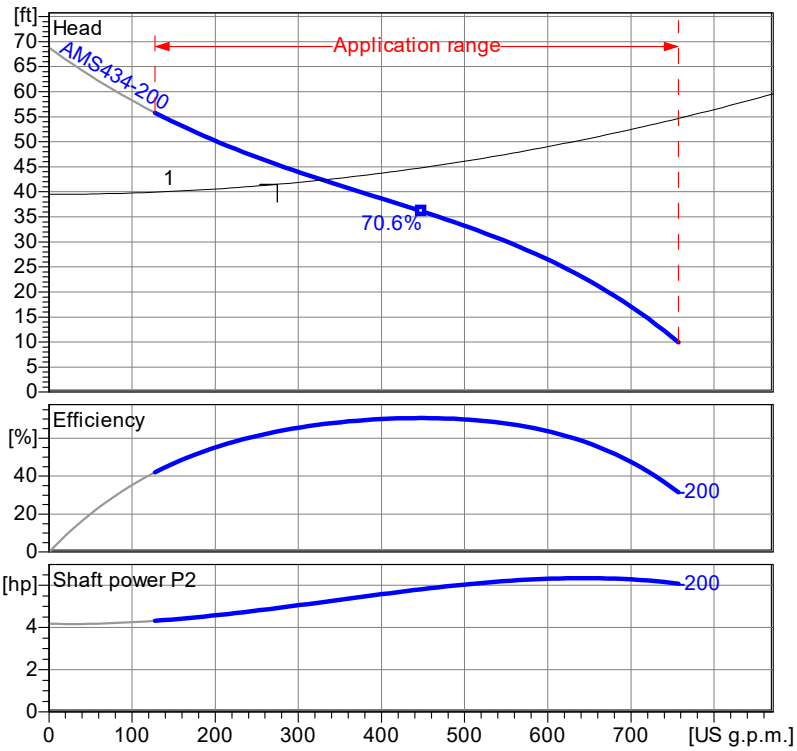
Rated voltage	230/ 460 V
Frequency	60 Hz
Rated power P2	7.5 hp
Rated speed	1750 rpm
Number of poles	4
Efficiency	86 %
Rated current	18.8 / 9,4 A
Degree of protection	IP 68

Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Impeller	Cast Iron ASTM A48;Cl.40B
Wear ring	Bronze ASTM B505; C93200
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel
Elastomers	Nitrile Rubber

Mechanical seal on motor side	SiC / SiC
Mechanical seal on medium side	SiC / SiC
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: **P2>10kW, HI Standard Grade 2B**
P2<10kW, HI Standard Sect. 11.6.5.4



Wet well installation with coupling kit (T, 200...230)
Dimensions in mm [inch], letters see table

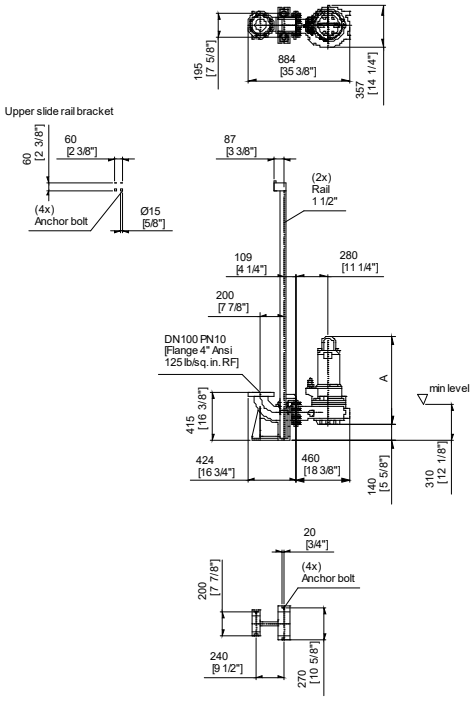


Table Dimensions
(inch)

A	$30^{1}/_{4}$

Project	Project no.:	Created by:	Page:	Date:
			1	2025-08-21

Performance Curve

AMS434-200/7,5T/C

HOMA PUMPEN MIT SYSTEM

Impeller

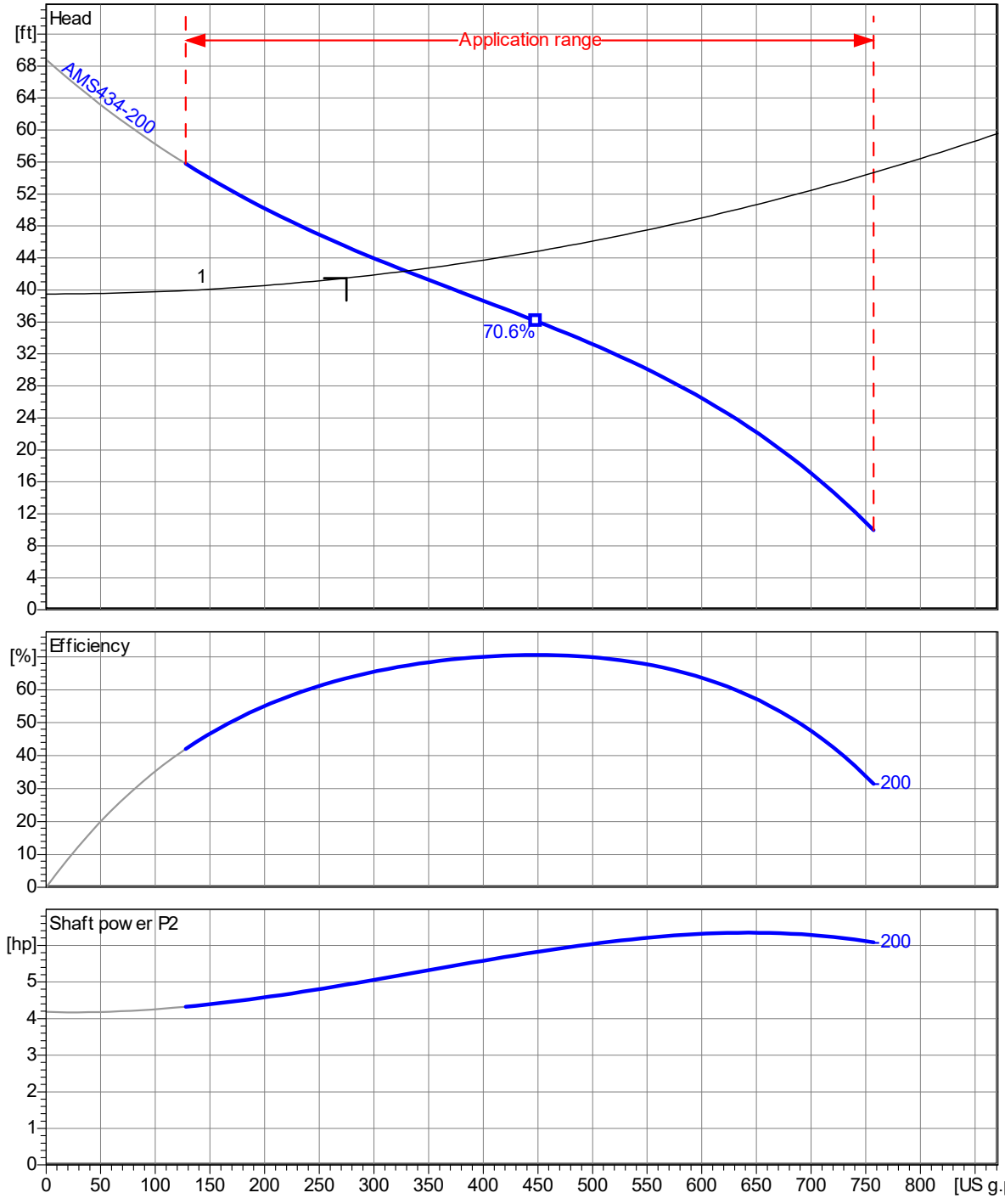
Impeller type:	Solid size Ø:	Max. Ø:	Min. Ø:	Sel. Ø:	
Single channel impeller	3 inch	$9^{1}/_{16}$"	$7^{1}/_{2}$"	$7^{7}/_{8}$"	

Operating data

Speed:	Frequency:	Duty point:	Shaft power P2:	Discharge port:
1750 rpm	**60 Hz**	**Q =275 US g.p.m. H =41.5 ft**	**5.21 hp**	**4" ANSI**

Power data referred to:
Water, clean [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **P2>10kW, HI Standard Grade 2B**
P2<10kW, HI Standard Sect. 11.6.5.4



2.0.1 - 28.01.2025 (Build 147)

Dimensions

AMS434-200/7,5T/C

Wet well installation with coupling kit (T, 200...230)
Dimensions in mm [inch], letters see table

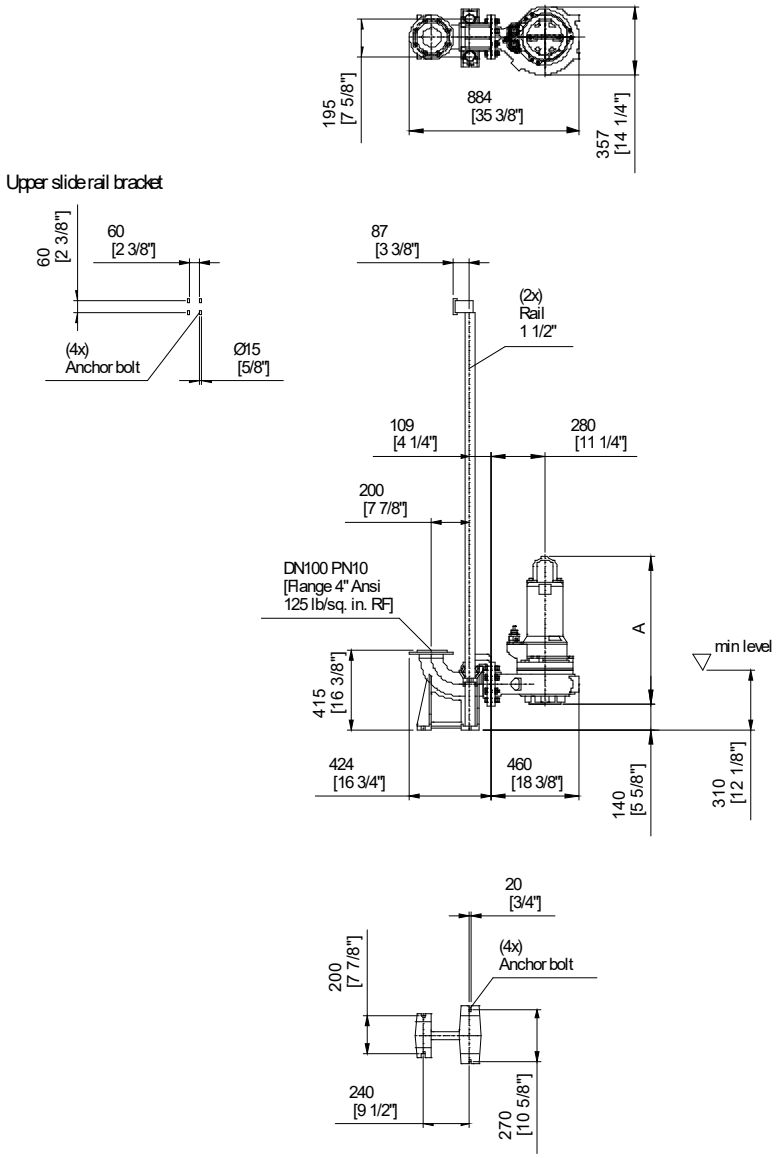


Table Dimensions (inch)

A	30 1/4

min level = Minimum fluid level for intermittent operation (S3)

Project	Project no.:	Created by:	Page:	Date:
			3	2025-08-21

Technical Data

AMS434-200/7,5T/C

Operating data					
Flow	**275 US g.p.m.**		**Head**	**41.5 ft**	**ft**
Shaft power P2	**5.2**	**hp**	**Static head**	**39.5**	**ft**
Pump efficiency	**67.3**	**%**	**Required pump NPSH**	**6.3**	**ft**
Pump type	Single pump		No. of pumps	1	
Fluid	Water		Temperature	68	°F
Density	62.31	lb/ft³	Kin. viscosity	1.077E-5	ft²/s

Pump					
Pump Code	AMS434-200/7,5T/C		Speed	1750	rpm
Suction port	DN100		Head Max.	55.8	ft
Discharge port	4" ANSI		Head Min.	10.0	ft
Impeller type	Single channel impeller		Flow Max.	757.3	US g.p.m.
Solid size	3	inch	Pump efficiency max.	70.6	%
Impeller Ø	7.87	inch	Required rated power max. P2	6.3	hp

Motor					
Motor design	Submersible motor		Insulation class	H	
Motor name	AM173.8,7T/4/3		Degree of protection	IP 68	
Frequency	60	Hz	Temperature class	T3C	
Rated power P2	7.5	hp	NEMA code	E	
			Explosion protection		
Rated speed	1750	rpm	Efficiency at % rated power 100%	86.0	%
Rated voltage	230 / 460 V	3~	Efficiency at % rated power 75%	88.0	%
Rated current	18.8 / 9,4	A	Efficiency at % rated power 50%	87.0	%
Starting current, direct starting	88.0 / 44	A	cos phi at % rated power 100%	0.87	
Starting current, star-delta		A	cos phi at % rated power 75%	0.84	
Starting mode	Directly		cos phi at % rated power 50%	0.76	
Power cable	14AWG-4+14AWG-4		Control cable		
Type of power cable	RHW-2		Type of control cable		
Cable length	32.8 ft		Service factor	1.15	
Shaft seal	Mechanical seal on motor side		SiC / SiC		
	Mechanical seal on medium side		SiC / SiC		
Bearing	Lower Bearing		Double row angular ball bearing		
	Upper Bearing		Deep Groove Ball Bearing		
Remarks					

Materials / Weight			
Motor housing	Cast Iron ASTM A48;Cl.40B	Bolts	AISI 304 Stainless Steel
Pump housing	Cast Iron ASTM A48;Cl.40B	Elastomers	Nitrile Rubber
Impeller	Cast Iron ASTM A48;Cl.40B		
Wear ring	Bronze ASTM B505; C93200		
Motor shaft	AISI 430 F Stainless Steel		
Weight aggregate	288.8 lb		

Project	Project no.:	Created by:	Page: 4	Date: 2025-08-21